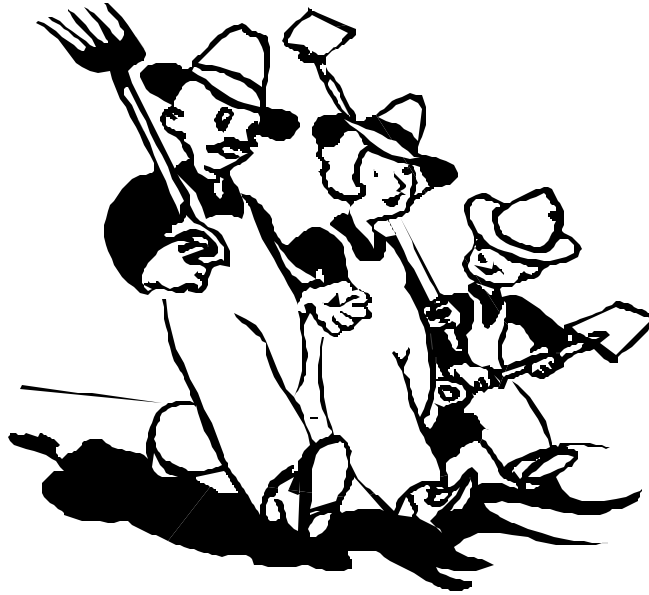


BUTLER COUNTY



RURAL LIVING

HANDBOOK

September 2003

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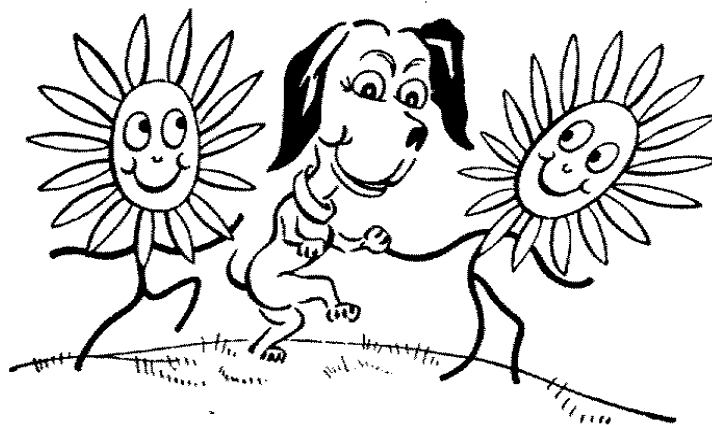
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CHAPTER 1

INTRODUCTION

So, you want to live in the country!

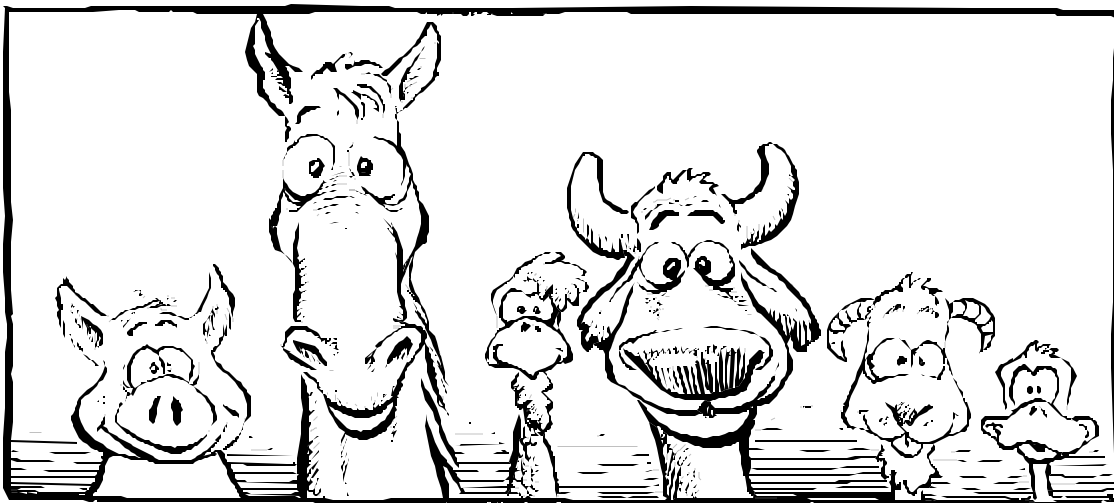
Are you a new resident to Butler County? Are you contemplating buying a home in the country? Are you thinking about purchasing land? Are you planning to build a new home in unincorporated areas of Butler County? Well, this booklet is for you!

Many of us want to live in the country. We yearn for those wide-open spaces, the quiet-ness of living in the country, no neighbors close by and a place for our kids to play without worry.

Rural living has its benefits, but it is important to realize (before you buy that land or country home) that living in the country is quite different than living in the city. You and your family will be faced with many new challenges, responsibilities, chores, and in some cases, extra expenses for the privilege of living in the country. In addition, some services that are available in the city may not always be readily available in the country.

So, before you buy that piece of land or dream home in the country, do a little research, know what to expect and know what to look for. In some cases, rural living may be more than what you bargained for.

This booklet is provided to you to as an educational and informational resource. The information is by no means complete, but it will give you the necessary references, connections and contacts to get you going in the right direction.



CHAPTER 2

Rural Living Checklist for Land and House Hunting

Property Address: _____ _____ _____
--

This list is designed to help you ask the right questions when looking at property or homes in the country. For additional information on the topics discussed below, refer to the following chapters in this booklet.

- Is there a flood plain on the property? Yes No
- Is/Will the home be served by a rural water district or a private well?
 Rural Water Available *Private Well* *Both*
- With an existing house, how old is the sewage treatment system? Does it meet current County Code?
- If building a home, what type of sewage system will I need to treat household wastewater?
 Lagoon *Septic tank with laterals*
- How do I access the property? Blacktop, dirt, gravel or sand roads? Are the roads maintained?
- What utilities are available?
 - ? Electricity _____
 - ? Natural Gas _____
 - ? Propane _____
 - ? Telephone _____
 - ? Cable _____
 - ? Mail _____
 - ? Water _____
 - ? Trash _____
 - ? Other _____
 - ? Other _____

- What school district is the property located in? Will bus service be available?

School District _____

- Are there any restrictive covenants or easements on the property? Yes No

List covenants or easements:

- Where are the nearest emergency services located? _____
- What is surrounding land use? *Cropland, rangeland, livestock, other* _____
- Is the property impacted by noises or odor? _____
- Is there a creek or pond located on the site? _____
- What direction does water flow off the property? _____
- What types of homes would be allowed on the site?
 Modular Manufactured Residential Designed Other _____
- What kind of soils are located on the property? _____
- What is the topography (slope, terrain) of the site?

- What type of vegetation is currently on site?

- Do you know what to do if severe weather threatens?

 ? Does/Will the home have a basement?

 ? If no basement, where is the nearest shelter in case of severe weather?

- How will I locate my home on the site, based on the above considerations?

CHAPTER 3

ITEMS TO CONSIDER WHEN LOOKING AT PROPERTY

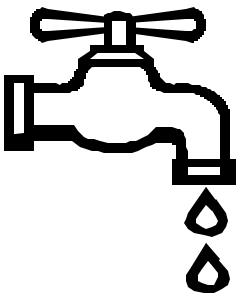
Not all property that comes up for sale can have a home or building put on it. Check with Butler County Planning, Development and Environmental Services before you purchase land to make sure that the property can be built on.

Easements may require you to allow utility companies or others to dig, trench or install roads, water lines, sewer lines, electrical lines or telephone lines across your land. Typically on an easement, no permanent structures can be built.

The property owner does not always own mineral rights. Check the title policy to know what minerals may be located on the property, and who owns them.

Don't assume that a fence is located on the property line. A professional survey is the only way to confirm where the true property boundaries lie.

Water



Many parts of Butler County have access to a Rural Water District water supply. In most cases, the City of El Dorado Water Treatment Plant sells treated water to the rural water districts. Some parts of Western Butler County get water from Sedgwick or Harvey County. Rural Water Districts charge homeowners for installing pipe from the nearest mainline to the home. Contact the Rural Water District in your area to find out the cost of installing water lines to your home.

In areas where no public water supply is available, the homeowner must drill a private well. Some disadvantages of drilling your own well are that the quality and quantity of water can vary during the year. Loss of electrical power will interrupt your supply of water from a well. In addition, drilling a well does not guarantee you will find water. The Planning and Development Department strongly recommends that homeowners hook up to a Rural Water supply if possible. If you choose to dig a well, it must be 25 feet from property lines and 50 feet or more from any sources of contamination such as septic systems, lagoons, seepage pits, fertilizer or pesticide storage areas, feed lots, or any other potential contamination sources.

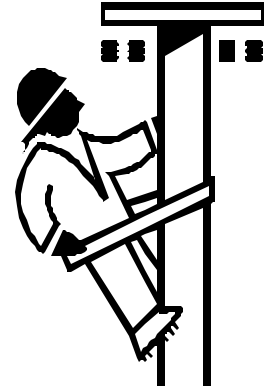
Refer to the fact sheets in Chapter 5 for more information on drinking water and water quality.

Electricity

Two different electric companies, Westar Energy (formally Kansas Gas and Electric, KGE) and Butler Rural Electric Cooperative, serve Butler County. These two companies have lines throughout the County, and it will depend on where your home is as to who will be your electricity provider.

Some items to consider if you are considering building a new home in the country:

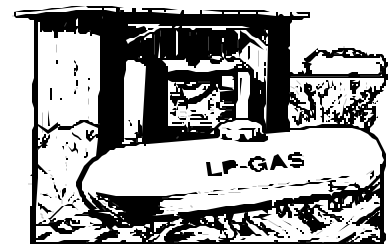
- Where is the nearest electrical pole? If the area you are building in doesn't have an electrical pole nearby, you may have to pay to have service extended to your home site. In addition, you may need to get easements from other property owners in order to extend electrical service to your property.
- Rather than have electrical poles running through your property, you may want to consider burying your electrical lines.
- Power outages may occur more frequently in rural areas.



Natural Gas or Propane?

Natural gas is available in certain areas where underground lines have been established in the county. Kansas Gas Service provides gas service to some areas in the county. If a natural gas line is close to your property, you may be able to hook onto it, but you will have to pay for the line from the main line to your home.

Propane is the only other alternative for persons out in the country who do not have access to natural gas lines. A propane tank is set up in the homeowner's yard and a line is run from the tank to the house. Rather than having a meter like you would for the natural gas line, a propane gas hauler comes to the house and fills your tank when it's empty.



The other alternative is to have all electric appliances.

Telephone

As with other services, you may have to pay to have lines installed from the nearest main line to your property if you are building a new home in the country.

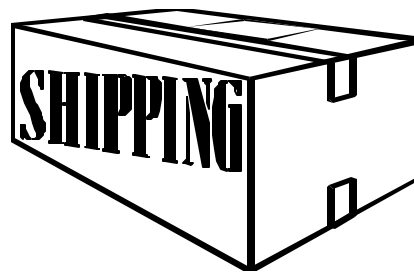


Mail and Packages



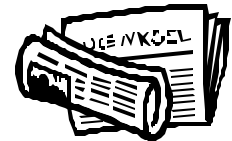
The United States Postal Service delivers mail to rural homes through their rural delivery service, or you can get a post office box in town. In most cases, if the home or land you are buying is on a mail route already, there will be no problem with establishing service to your new address. You may want to check with the Post Office to assure that your mailbox meets their regulations on size and height. If you are building a new home where there isn't an established route, check with the Post Office first to see if service can be extended to that area.

The United Parcel Service, Roadway Package System, Federal Express, and other private mailing services will deliver to rural addresses but you may want to check with them to make sure before you have packages delivered to your country home.



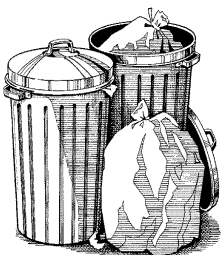
Newspaper Delivery

Newspaper delivery is not always available in the country. Check with your newspaper before assuming you can get delivery to your home in the country.



Trash

In most rural parts of Butler County, trash service is available. Check the yellow pages under trash hauling for companies that collect trash and ask them about rural collection. Generally, if you are close to a town, trash haulers will pick up your trash.

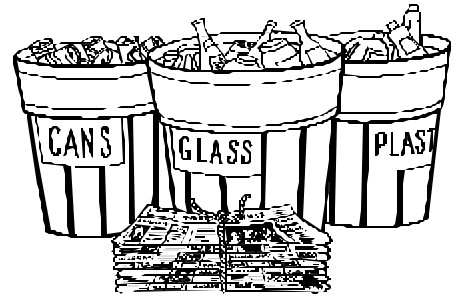


If trash service is not available, you will have to haul trash to the landfill yourself. This can be rather inconvenient to the rural homeowner, not to mention having to store trash till one finds time to take it to the landfill when the landfill is open. And there is more possibility of rodents or animals getting into your trash when it is not collected regularly.

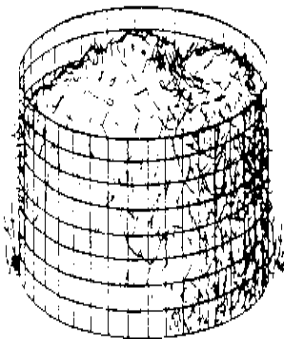
Burning trash in unincorporated areas of the county is still legal; however, you must call your fire department for a burn permit. Trash burning is not recommended due to the fire hazard. There are also environmental concerns with trash burning.

Recycling

Recycling is available at the landfill and in most cities in Butler County. It is a free service to Butler County residents. Recycling reduces the amount of trash that goes into the landfill. Items that can be recycled include newspapers, tin and aluminum cans, mixed paper, glass, cardboard and some plastic containers. Contact the nearest city for recycling services, dates and times. You can also contact the Butler County Solid Waste Coordinator at 316-320-1453 for more information.



Composting



In January 2002, a yard waste ban went into effect at the landfill. Yard waste can no longer be dumped in the landfill with your regular trash. This includes grass clippings, tree limbs, brush, leaves, etc. You can take yard waste to the landfill's composting site, or start composting at home. Contact K-State Research and Extension office for more information on home composting. You can also contact the Butler County Solid Waste Coordinator at 316-320-1453 for more information.

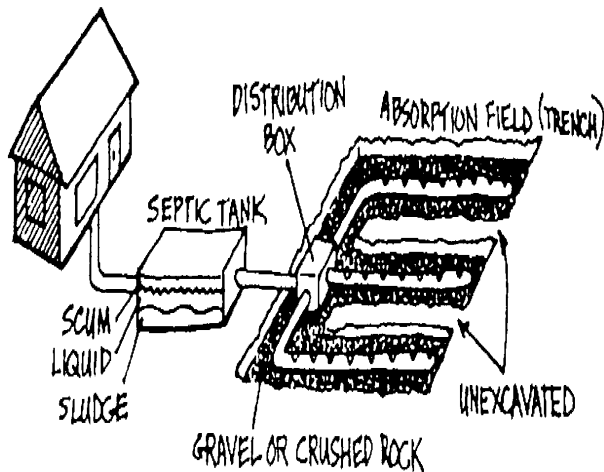
Household Hazardous Waste

Household wastes such as motor oil, antifreeze, batteries, paint, paint thinners, lawn and garden chemicals and household cleaners are considered hazardous waste and should not be disposed of in your regular trash. A Household Hazardous Waste Facility is located at the Butler County Landfill at SW 40th and Boyer Road. Butler County residents can use the facility for free to dispose of any unused or unwanted



household hazardous materials. The facility is open the first Saturday of each month, from 8:30 AM to Noon, or by appointment. Call 316-320-1453 for more information.

Sewage

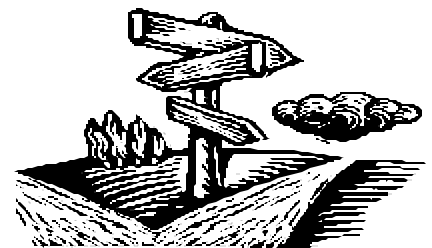


Sewage is not something we like to think about, but it must be addressed. Rural homeowners don't have a lot of options when it comes to sewage disposal. Unless you are close enough to a town that will extend their sewer lines into a small development, you are faced with handling your sewage with a lagoon or septic system. In many parts of Butler County, the soil is not suitable for septic systems due to high clay content. In order to have a lagoon, the rural property must be at least 5 acres.

Maintenance is another issue with on-site sewage systems. Many times, after a system is completed, maintenance is not thought about until the homeowner starts having problems, such as sewage backing up into the house. Refer to Chapter 5 for fact sheets on lagoon and septic system maintenance.

Roads

When living in the rural setting, you will most likely be driving township roads with dirt, gravel or sand surfaces. These roads are often rough, so don't expect to be able to drive on them as you would a blacktop road. When it rains, some roads will be impassable due to the mud surface or flash flooding. And don't expect your cars to stay clean!



Butler County is divided into townships. Each township is 36 square miles. Each township has a township board that is responsible for road repair and maintenance on roads not maintained by the County or State.



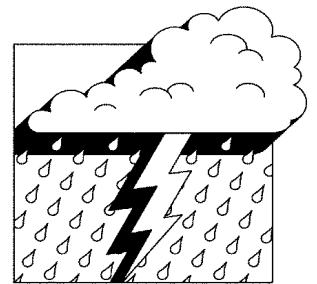
Money for road maintenance is provided through Butler County. In most cases, the money the townships receive each year is limited, so they cannot do a lot of extra road repair and work. If you have problems with plugged culverts, ditches that don't drain, roads that

need maintenance, etc. call one of your township trustees for assistance (refer to Chapter 6, Township Boards).

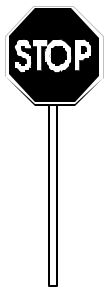
Before establishing a driveway to your new home, check with the Butler County Public Works Department and your township official. You may not be able to put a driveway right where you want to. Factors that determine driveway access include whether the road is paved or not, how much traffic uses the road, drainage factors, etc. Paved roads are classified as arterials for high-speed travel and therefore, your access might be limited. Culverts are required when establishing a driveway over a ditch. The Public Works Department can assist you in determining what size the culvert should be for the water that flows through the ditch during rainfall events.

Extreme weather conditions may create difficult driving conditions in the country. Rain or melting snow can make usually good roads impassable.

Floodwaters can temporarily close roads not to mention washing all the sand or gravel off. You may not be able to get out for a day or two if floodwaters make roads impassable. Drifting snow can also make roads impassable. Township equipment will not open your driveway for you. In fact, they may grade your driveway shut when opening the road.



In the summer, dust can be a problem on unpaved roads. You may not like dust drifting into your yard every time a car drives by.



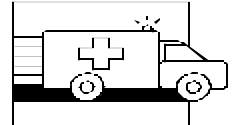
Most township road intersections don't have stop signs, yield signs or other traffic control devices such as railroad crossing lights, so extra caution should be used when traveling. Bridges are narrower. Slow moving farm vehicles and equipment travel township roads to get to their fields. You may also see an increase in vehicle maintenance costs due to more flat tires, front-end alignments, etc.

School buses travel only on roads designated as school bus routes by the school district. Check to make sure that your school district has a bus route out to your home.



Emergency Services

Emergency services in the city are usually very prompt. In the country; however, this can be a different story. Volunteers provide many of our emergency services. This adds time onto an emergency run. If you live in a secluded or hard to reach area, it may take even longer. If your driveway is narrow or has a bridge or culvert under it that won't support large equipment (such as a fire truck), or if trees or other hazards are in the way, emergency personnel may not be able to get to you at all. Keep these things in mind when looking at property.



Fire Departments – With the exception of El Dorado, Rose Hill, Augusta and Andover, every city has volunteer fire departments. This means that when you dial 9-1-1, volunteers are paged and must drive to the fire station before they get into the fire truck to make their way to your home. Another issue you must take into consideration is water supply. There are no fire hydrants in the county, thus fire departments have to haul their own water supply to put out fires.

Ambulance – Butler County Emergency Medical Services (EMS) provides ambulance service for all Butler County. Butler County EMS has 3 full time crews stationed in El Dorado, Andover and Augusta. Volunteer EMS crews staff trucks in Douglass, Rose Hill and Potwin on an as-available basis.

Law Enforcement - Normally, people think of country living as a good place to raise their kids and get away from all the crime in the city. Even so, crime and vandalism do occur in rural areas. You must still take precautions to protect yourself, your family and your



The County Sheriff has jurisdiction in unincorporated areas of Butler County. In some cases, if you are close to a town that has a police officer, they will assist in an emergency.

Keep in mind that in the city, police protection covers square blocks. In the country, the county sheriff's area covers square miles. Report any unusual activity, crimes, burglaries or thefts to the County Sheriff. For emergencies, dial 911. The non-emergency number is 316-322-4254 or 1-800-794-0190.

Flood Plains

Construction in a flood plain is very restrictive. The Butler County Planning and Development Office has the Federal Emergency Management Agency (FEMA) flood plain maps for Butler County. Flood plain maps were developed to help planners, homeowners and others determine whether a property in question is in a flood plain or flood way.

Homes in these areas can be insured through the National Flood Insurance Program, but insurance rates will be higher. Butler County does not allow construction in a floodway. Construction is allowed in the flood plain but more strict regulations are put in place to assure that the home and any other structures are protected from floodwaters.

Soils

Soils in Butler County vary from rocky in the eastern portion to clayey in the western portion with just about everything in-between. When purchasing land, building a home or buying a home in the country, it is good to know what soil types you are dealing with on the property. For instance, you wouldn't want to buy property in the Flint Hills if you plan to till the land and plant crops. Some soils have limiting factors such as bedrock close to the surface, slow permeability, high erosion potential, etc.



Contact the local USDA Natural Resources Conservation Service (NRCS) Office for information on soils on property you intend to purchase (refer to Chapter 6, USDA Natural Resources Conservation Service). A soil survey is available at the NRCS office for your review. The soil survey can tell you what type of soil(s) are found on site, how deep the soil is before you hit rock, whether the soil is suitable for a septic system, lagoon, basement, foundation or pond, provides information on drainage or how fast water moves through a particular soil type and what type of trees or crops will grow best in that particular soil.

Drainage

Drainage can be a big problem in many areas of Butler County. Many times, drainage is not a problem when we first move to a site, but when additional homes are built, more drainage problems can occur. It is not always clear that drainage can be a problem because many times when we are looking at property, we don't go when it's raining. A topographic map, available from the local Natural Resources Conservation Service, is a good resource to determine how and where water flows from a property.

Some key items to look for when purchasing property:

- ? Look for low spots where water sets.
- ? Look for vegetation that you normally associate with wetlands or swampy areas.
- ? Look for ditches or low areas where water will run to during a heavy rainfall.
- ? Look at surrounding land-does it slope towards your property or away from your property?

Now, imagine your house located on this site and try to determine how this will affect the drainage around the site.



Ponds

Many homeowners are interested in having a pond on their property. Ponds can add value to a property, but they could also become a liability. Your insurance may be considerably higher if a pond is constructed on your property. You could be held liable if an accident occurs at your pond as well. In addition, some ponds will require federal or state permits before construction begins, depending on their size.

Some items to consider:

You will need 30 to 50 acres of drainage area above the pond, depending on the type of pond you construct, to fill up the pond once completed.

Land area requirement: The land area requirement is dependent on several factors such as topography, drainage, soils, type of pond, etc. As a rule of thumb, you will need at least 20 acres to be able to construct a pond on your property.

Remember, you cannot back up water on another person's property without written approval from that property owner.

Weeds

Kansas has a noxious weed law that requires all persons who own or supervise land in Kansas to control and eradicate all weeds declared noxious by legislative action. Control is defined as preventing the production of viable seed and the vegetative spread of the plant.



Weeds that are declared noxious in Butler County include: field bindweed, musk thistle, Johnsongrass, bur ragweed, Canada thistle, leafy spurge, hoary cress, quack grass, Russian knapweed, kudzu, pignut and Sericea Lespedeza.

The Butler County Weed Department (316-321-5190) can help you identify noxious weeds. They provide sprayers and herbicides at reduced prices to help you control any infestations you may have. Remember, any time you use chemicals, you have the

responsibility to protect our groundwater and surface water sources. Read and follow all label directions and practice safety when working with chemicals. Keep a safe distance from wells and surface water.

Wildlife

You will probably see more wildlife in the country than you did in the city. Wildlife in Butler County include skunks, opossums, raccoons, deer, coyotes, turkey, pheasant, quail, fox, badgers, geese and ducks, to name a few. Wildlife are fun to watch but remember, they are wild creatures and should be treated as such.



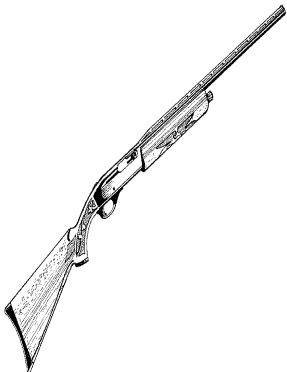
Wildlife pose dangers in a couple ways. For instance, skunks are known to carry rabies. If you see a skunk (or any wild animal) acting unusual, such as a nocturnal animal walking around during the daytime, do not approach the animal. Animal bites are handled through the Butler County Health Department at 316-321-3400 or 1-800-940-6083.



Another way wildlife pose a danger is crossing roadways. They can do serious damage to your vehicles.



Kansas is known for good hunting, so expect to see more traffic, hear gunshots and see hunters during the hunting season in the rural areas. Hunters do not have the right to hunt on your property unless you give them the right to do so. If trespassing occurs, or you suspect illegal hunting activities, contact your local Kansas Department of Wildlife and Parks conservation officer. If you can, get a license tag number if the hunters leave the area before an officer arrives.



Pets

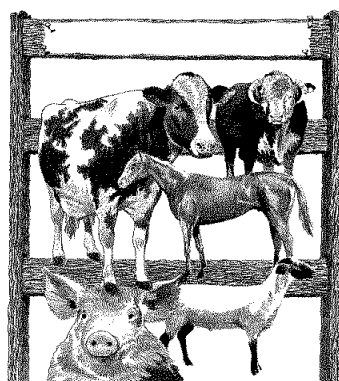


Everyone has a right to own a pet if they choose. But, along with pet ownership comes the responsibility to take care of that pet. If you have pets, provide food, shelter and a fenced in area for them. Make sure your pets have all the necessary shots (such as rabies), as required.

Many times, pet owners decide they don't want their pet anymore, and go out into a rural area to dump it off to fend for itself. This usually results in the pet being run over by a car, getting shot, getting killed by a wild animal or starving to death. If the pet is lucky, some homeowner will take it in, but this is usually not the case.

The Butler County Animal Control Program was established in Butler County by Resolution #98-87. Complaints regarding stray, nuisance or vicious dogs should be directed to the Animal Control Officer at 316-322-4325. The Sheriff's Office (316-322-4254) is responsible for calls pertaining to livestock, exotic animals, and animal cruelty. The Health Department (316-321-3400) is responsible for calls pertaining to animal bites. After hours calls are taken by Butler County Sheriff Dispatch and distributed to the appropriate department.

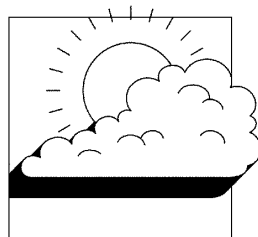
Farm animals – You must own 3 acres or more in Butler County in order to own farm animals such as pigs, goats, sheep, horses and cattle.



Weather

Weather occurs everywhere, but you will probably notice it more in the rural environment.

Some things to consider about weather when living in the country:



- In the city, you are protected from wind by other houses and trees. In the country, you may not have this protection.
- Straight-line winds during thunderstorms can cause as much damage as a tornado.
- Lawn furniture, grills, garbage cans, children's toys and similar items are more likely to be blown away in the country.
- Along with the wind comes dust. Dust will come from roads and farm fields. In the winter, the wind can whip snow into deep drifts around your home.
- Tornadoes are always a threat in Kansas.



- In the city, when tornadic activity approaches, warning sirens are sounded to alert people of upcoming danger. In the country, there are no sirens.
 - It is your responsibility to watch the weather and take the necessary precautions to assure your own safety.
 - A weather radio is a good investment. A weather radio will warn you of severe weather in the area and give you extra time to take shelter.
 - When buying a home, check to make sure there is adequate shelter for use during severe weather. A small, reinforced room in the center of the basement is the best shelter. If there isn't a basement, consider putting in an underground shelter adjacent to the home.
 - When building a home, include building a storm shelter for you and your family's safety. Also consider additional reinforcement of trusses, roofs, etc. to provide even more protection against strong winds and tornadoes.
- Townships are not responsible for removing snow from your driveway. Keep this in mind when you are looking at property. You may be stuck if you do not have a snow blower or good neighbor with a tractor to clear your drive.
- When it rains, flooding of roads and low-lying areas is a common occurrence in the country. You may not be able to get out for several hours or several days, depending on your location to major rivers, creeks and tributaries.



- Never walk through flowing water. Six inches of moving water can knock you off your feet.
 - Do not drive through a flooded area.
- The weather can play havoc on utilities, especially electrical services. In the country, if your electricity goes off, you may not get it turned back on for several hours. If you rely on a water well for household water, you won't have any water during that time either. During winter weather, your mail may not be delivered if the mail carrier can't get through. When your electricity goes off, call your electrical supplier to alert them of the outage.

- Utility companies do their best to restore service to rural areas as quick as they can. Even so, prompt service will not always occur because of the extent of line damage or damage in several areas. When living in the country, patience is a good virtue.

Easements and Rights of Way

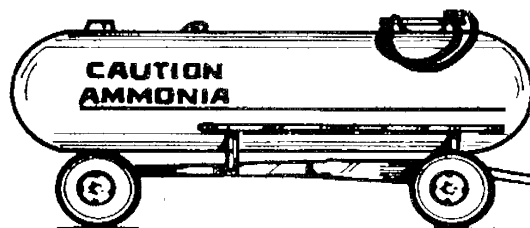
There may be existing easements on land you wish to purchase that are not visually apparent. Easements give another party, such as a utility company or pipeline, the right to install, repair or replace a pipeline, electrical line, water line, or other facility or utility on your property.



In Butler County, no permanent structures can be placed on an easement. This may reduce the amount of property you would have to construct a home or other building, or prevent you from building where you want to. When considering buying a property, be sure to check for easements. A title search is helpful.

Hazardous Materials

Hazardous materials travel across Butler County every day by way of train, truck, tractor and automobile. In the country, you will see anhydrous ammonia tanks being transported to and from farm fields by truck and tractor. Large field sprayers carrying pesticides move from field to field and farm to farm. Farmers transport large gas or diesel tanks on the back of their trucks for fueling their tractors.



Rail cars and semi trucks carry hazardous materials across the county. Would you know what to do or who to call if an accident occurs? For emergencies, always call 911. They will contact other agencies who need to be involved with cleanup or emergency response.

CHAPTER 4

LIVING WITH YOUR AGRICULTURAL NEIGHBORS



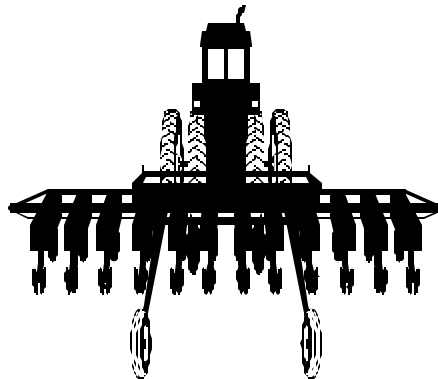
For farmers and ranchers, getting their crops sown and harvested and tending to their livestock is how they make their living.

Most non-agricultural people work the hours of 8 AM to 5 PM. Your agricultural neighbors, on the other hand, may head to the field at 6 AM to work farm ground or tend to livestock and they may not return home until 10 PM at night. During their planting and harvest seasons, it's not likely they will take the weekend off either.

Farming activities produce noise, odor, increased vehicle traffic, dust, pollen and mold spores. These activities may not suit your personal lifestyle and could be detrimental to your health if you suffer from allergies or asthma.

If you have a farmer for a neighbor in the country, here's what to expect:

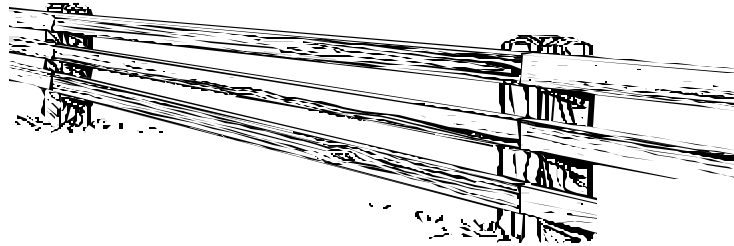
- During the spring and summer and during planting and harvest seasons, there will be trucks and trailers parked along the road, slow moving combines and tractors moving from field to field and farmers burning wheat stubble or rangeland.



- Your closest neighbors could also be the four-legged kind. Cattle, sheep, horses, pigs, chickens and other farm animals create manure and noise. Typically, manure is used as a fertilizer on the farmer's fields. If you happen to be adjacent to a field that is spread with manure, you can expect odor and even an increase in flies until the manure is worked into the soil.



- Keep in mind that farm animals do break out of fences and might decide to check out your new landscaping project or taste the garden fare.



- Remember that some farm animals can be dangerous.
- Land preparation, harvesting and planting can create large amounts of dust, especially during dry and windy conditions.
- Burning stubble or rangeland creates a lot of smoke and odor. Ashes from burned stubble or rangeland will fall on neighboring properties.
- Fertilizers, herbicides and other chemicals are used extensively in farming and ranching operations. Wind may drift these chemicals onto neighboring properties. In addition, there is always that chance of an accidental spill.



Glossary of Agriculture Terms

Acre – 1 acre equals 43,560 square feet. An acre is 208 $\frac{3}{4}$ feet by 208 $\frac{3}{4}$ feet. A section of land (1 mile square) is 640 acres.



Anhydrous Ammonia – Carried in tanks, usually white and capsule shaped. Farmers use anhydrous ammonia as a fertilizer on their fields.

Cattle

Bull – male

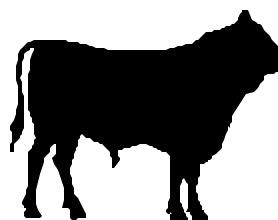
Calf – the young of the cow. Calves are usually weaned from the cow at 400 – 600 pounds.

Cow – female

Heifer – a young cow that has not had a calf

Steer – a “fixed” or former male

Stocker – a 500 to 750 pound calf



Beef cattle weigh approximately 1,100 pounds when sent to market. The Flint Hills in Eastern Butler County provides excellent rangeland for beef cattle.

Chicken

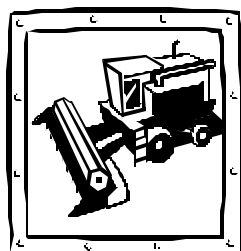
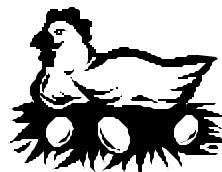
Hen – female

Rooster – male

Chick – young chicks

Pullets – young chicks that are ready to start laying

Broilers – grown for meat



Combine – A farm machine, which combines the processes of heading, threshing and cleaning grain while harvesting it in the field.

Corn, Milo, Sorghum, Soybeans – Planted from early May to June. Harvested in the fall.



Cotton – A relatively new crop to Butler County. Planted from May to June and harvested in late fall or winter.

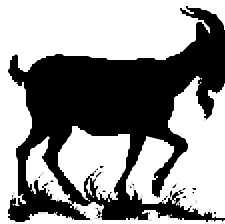


Goat

Doe – female

Billy or Buck – male

Kids – the young of the doe



Hay – Alfalfa, brome, clover, native grass and the like, that is cut and dried and then baled and stored in a barn or along the edge of a field.

Horse

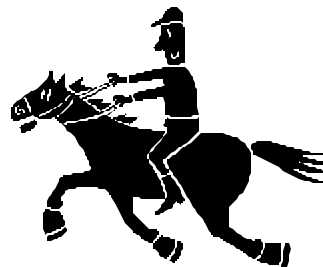
Mare – female

Stallion or Stud- male

Colt – young male

Filly – young female

Gelding – a “fixed” or former male



Noxious Weed – Weeds that are declared noxious by Butler County. All persons who own or supervise land in Kansas are required to control noxious weeds.

Pasture – Grass or herbage that cattle or other grazing domesticated animals eat. May consist of native grasses such as Big or Little Bluestem or introduced grasses such as brome or fescue.

Rabbit

Doe – female

Buck – male



Range – A row of townships, six miles in width, between two successive meridian lines.

Rangeland – The Flint Hills in Eastern Butler County is an excellent example of rangeland. Typically, rangeland consists of grasses native to the area. In many cases, these areas have never been broken out for raising crops.

Riparian – Pertaining to the banks of a creek or river. A riparian zone is the area of land adjacent to the creek or river.

Section – an area of land, one-mile square, containing 640 acres and constituting 1/36 of a township.

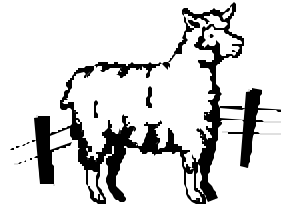
Sheep

Ewe – female

Ram – male

Lamb – the young of the ewe

Wether – a “fixed” or former male



Slow Moving Vehicles – Tractors and/or tractors pulling farm machinery, combines, or any other farm related machinery use state, county or township roads. These vehicles move slowly and will not be able to get out of your way quickly, especially when the machinery is pulling a large implement.

Swine

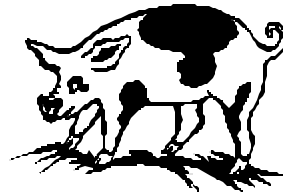
Sow – female

Boar – male

Piglet – baby pig

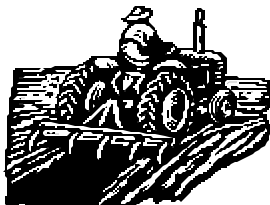
Gilt – a young female

Barrow – a “fixed” or former male



Township – A unit of area in surveys of lands, six miles square, subdivided into 36 sections of one square mile each.

Tractor – Used for fieldwork such as plowing, disking, sowing, baling hay, etc.



Watershed – An area of land that drains water to a common downhill point such as a river, lake, creek or stream.

Wetland – An area of land that remains wet for a period of days and supports wetland vegetation.

Wheat – Sown in the fall and harvested from late May to July.



CHAPTER 5

INFORMATION SHEETS

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Butler County
Planning, Development and Environmental Services Department
Butler County Courthouse
205 West Central
El Dorado, Kansas 67042
316-322-4325 or 1-800-940-6017

Requirements, Regulations and Building Codes

The following information is provided to help you determine the steps you'll need to take when you purchase property and build a home or other permanent structure on the property:

In order to build or build onto a home, build an accessory building (such as a garage or swimming pool), build a commercial building, place a single-wide or double-wide manufactured home, construct a lagoon or septic system, or drill a water-well, one needs a permit from our office. After the permit application has been received, we will do an inspection. If construction has proceeded before the permit has been issued, the permit will cost quadruple the normal amount. The permit application needs to be filled out completely and accurately in order to avoid delays in the inspection process. You are responsible for contacting the Rural Water District and finding out locations of water lines near your property as well as the location of any easements (such as for utilities or petroleum pipelines) running through your property. The following are some of the things that you need to know and answers to commonly asked questions. This sheet is not a comprehensive summary of the Butler County Zoning Regulations and/or the Butler County Sanitary Code and should not be construed as such.

Setback Requirements - All structures must be a certain distance from the front, side, and rear property lines. If your property is on a corner, the two road-facing sides are considered front yards. Ask for a setback schedule showing the requirements categorized by acreage.

Single-Wide Manufactured Homes – A single wide home may be placed only on land zoned MH – Manufactured Housing; to replace an existing single-wide; and for farm help on forty (40) or more acres zoned AG – Agriculture. The permit fee is \$150.00.*

Double-Wide Manufactured Homes - Double-wide manufactured homes, manufactured after June 15th 1976, can be placed anywhere that a site constructed home is allowed. It is a State of Kansas requirement that these types of homes be placed on a permanent foundation built to Uniform Building Code Standards. The permit fee is \$200.00.*

Site-Constructed Homes – Homes must be built to Butler County Building codes. The permit fee is \$150.00.*

Commercial Buildings - A commercial building is any building used for commercial purposes. The applicant will have gone through the process of obtaining a conditional use permit, which is necessary if one wants to operate a business in the unincorporated areas of Butler County. The permit fee is based on valuation.

Water-Wells - It is strongly recommended that homeowners hook up to Rural Water if possible. If you cannot, or choose to dig a well, it must be 50 feet from any sources of contamination such as septic systems, lagoons, sewer lines, pit privies, seepage pits, fuel or fertilizer storage areas, pesticide storage areas, feed lots, or any other potential sources of pollution or contamination. One may want to consider a house and any accessory buildings as sources of pollution. For example, one may find it necessary to treat a house for termites in the future. Wells must be 25 feet or more from the nearest property line and must be disinfected before using. The permit fee is \$100.00.*

Septic Systems - One must have at least three acres in order to install a septic system. A soil percolation test must be performed and passed successfully to obtain approval for a septic system. Septic systems must be 50 feet away from all surface waters such as streams, lakes, wetlands, and ponds. All parts of the septic system and lateral field must be at least 25 feet away from adjoining property lines and potable water lines (you are responsible for contacting the Rural Water District, if any, and having the water line location staked). The initial inspection will consist of an inspector examining the staked site and checking required distances to the aforementioned entities. A final inspection is required after construction is complete and before the lateral field is covered with soil. Ask for a copy of minimum requirements for more information and specifications. The permit fee is \$200.00.*

Waste Stabilization Ponds (Lagoons) - One must have at least five acres in order to construct a lagoon. Lagoons require three inspections. The first is for site approval, which will be performed after the four corners of the inside of the lagoon's berm have been staked. The second inspection is performed after construction to ensure that the lagoon has been built to specifications. A common problem in some areas of Butler County is rocks. You must communicate to your contractor that rocks on the lagoon's berm are unacceptable. The third inspection will be performed after the lagoon has been fenced and seeded with grass. The use of the lagoon is prohibited until after the final inspection and concurrent approval.

A lagoon must be 50 feet from the house it is servicing, 100 feet from all property lines, including public right-of-ways, 50 feet from all water wells, 25 feet from potable water lines (you are responsible for contacting the Rural Water District, if any, and having the water line location staked), and 50 feet from all surface waters such as streams, lakes, wetlands, and ponds. When considering the site of the lagoon, one should keep in mind that nothing should be constructed as to block the prevailing southwest winds from reaching the surface of the lagoon. Wind action is necessary and vital for proper lagoon functioning. For example, unpleasant odors could result without proper wind action.

Ask for a copy of minimum requirements for more information and specifications. The permit fee is \$200.00.*

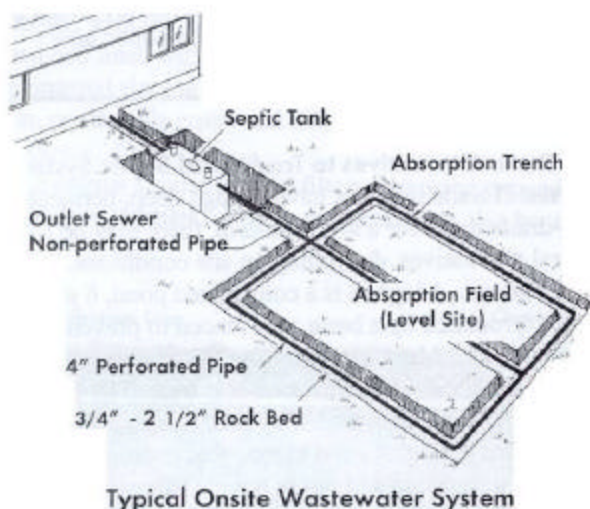
Common Violations of the Butler County Zoning Regulations and Sanitary Code--

The following are some of the most common causes of landowners being issued a violation letter and/or being prosecuted by the County Attorney. Illegal dumping of trash, dumping trash down riverbanks, operating a junkyard or salvage operation without proper County and State permits, unfenced lagoons, sewage surfacing from failing septic systems, junk or inoperable vehicles in excess of two, having a single-wide mobile home in addition to an existing dwelling, use of a single-wide mobile home for other than a dwelling, living in a recreational vehicle or camper, livestock on less than three acres, portable signs, storage of waste tires, building without a permit, having more than four adult dogs without a kennel license, and running a business without a conditional use permit. If any violations of the Butler County Zoning Regulations and/or the Butler County Sanitary Code are discovered during any construction authorization inspection, you will be issued a violation letter and your application will not be considered until the violation is abated. When a violation is discovered during an inspection or at any other time, the violation will be photographed and a violation letter mailed to the record landowner of the property where the violation exists. Approximately 30 days after receiving the letter, the property will be re-inspected. If a violation still exists, the case will be turned over to the County Attorney for prosecution. It is easier to avoid violations beforehand by keeping your property in compliance.

- ***Permit Fees are Subject to Change.***



Where sewers and central wastewater treatment plants are not available, some type of onsite wastewater treatment system is necessary. Onsite systems must completely treat the wastewater and allow it to be absorbed by the soil or through evaporation without causing contamination, nuisance, or odor. Surface discharge of wastewater from individual homes is illegal in Kansas.



A septic system composed of a septic tank and absorption field is the most common onsite system for homes. Treatment of the wastewater begins in the septic tank. Final treatment and absorption of the wastewater occur in the absorption field (also called lateral, leach, or drain lines/fields). Other types of onsite systems include lagoons and alternative systems that provide additional treatment before reaching the absorption field.

The Importance of Soil

Under the right conditions, soil is an excellent wastewater treatment system. The type and depth of soil determines the size and kind of onsite system that can be used. The soil with attached microbial life treats wastewater by:

1. Filtering out small solids,
2. Destroying microbes,
3. Breaking down dissolved organics, and
4. Holding nutrients for plant growth.

Get to Know Your Septic System

(Onsite Wastewater Treatment)

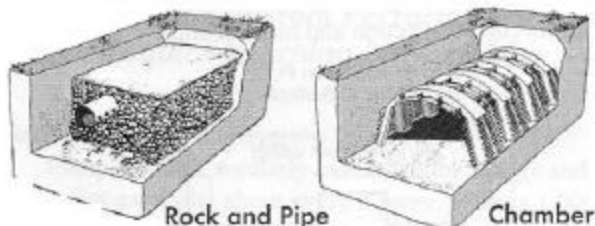
Enough soil depth is required to get sufficient treatment of wastewater. An adequate oxygen supply in the soil is essential for efficient treatment. If the thickness of soil below the trench bottom is not great enough to treat the wastewater before it reaches groundwater or a layer of rock, an alternative system can be used to pretreat the wastewater before it is applied to the soil.

The ability of the soil to absorb and treat wastewater is determined by careful soil profile examination or sometimes by percolation (perc) tests. A soil profile is the identification and evaluation of soil properties as seen in a trench at the field site. A percolation test measures the rate of drop of the level of water in a hole in thoroughly saturated soil. A soil profile can provide more information and more consistent results than a perc test.

Soil Absorption Field: What Are The Options?

The soil absorption field disperses septic tank effluent (outflow) throughout a large area where it is further treated and absorbed. The size of the absorption field is based on soil properties and the expected wastewater flow.

Laterals or Trenches. The most common absorption field design is a system of trenches, usually 2 to 3 feet wide and spaced 7 to 10 feet apart. The bottom of a trench should be no more than 3 feet deep. For best oxygen transfer, 2 feet deep is more effective. To convey the wastewater throughout the field, the trenches are filled with rock surrounding a perforated plastic pipe or with chambers. Chambers are interconnecting plastic structures with open bottoms and side slots that allow the septic tank effluent to reach the soil.



The lateral system provides optimum treatment because oxygen enters through the soil on each side to reach the wastewater around the trench. The rock or chambers should be covered with 6 to 12 inches of soil to

allow grass to grow and to prevent freezing. Shallow, widely spaced laterals maximize the opportunity for nutrient removal and evaporation.

To divide wastewater between lateral lines, pipe systems or distribution boxes can be used. When an absorption field is on a slope, the laterals should be level and parallel to the contours of the hill. Drop boxes or raised pipe segments transfer the wastewater to the next lower line when the higher one is full.

Drip Irrigation. Subsurface drip irrigation may be used for an absorption field. Pretreatment by an alternative system is used ahead of the drip system.

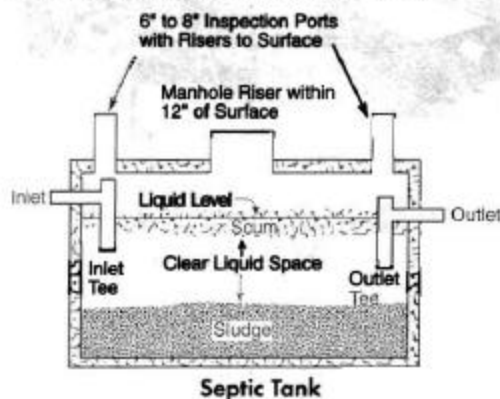
Beds. When space is very limited, a seepage bed or an evapotranspiration bed is sometimes used because it can fit into a smaller area than a lateral system. Beds lack most of the sidewall area of laterals and thus the oxygen supply is very limited in the center of the bed. These systems are more effective in dry climates than in wet, humid conditions.

Seepage pits and cesspools (dry wells). These systems have been illegal in Kansas since regulatory changes in 1996. They are not designed for good wastewater treatment and may cause groundwater contamination.

The Importance of a Septic Tank

To reduce the amount of waste that the absorption field must treat and to protect the field, raw sewage flows through a tank where the solids separate from the liquid before it enters the field. Lighter materials such as soap scum, oil, and fats form a floating layer at the water surface. Heavier solids accumulate at the bottom and are partially decomposed by microbial activity. The anaerobic environment in the tank begins the treatment process and digests accumulated solids, reducing sludge volume. Effluent from the tank contains small solids, dissolved organics, nutrients, and microorganisms including pathogens. Although wastewater is partially treated in a septic tank, the effluent is still sewage.

The septic tank should be watertight, corrosion-proof and of proper size and dimensions. A tank that has easy surface access and inspection ports is essential to perform needed inspection and maintenance.



Safety. Never go into a septic tank unless properly equipped. The natural processes in a septic tank generate gases that are poisonous, flammable, and will cause asphyxiation.

Should I Use Septic Tank Additives?

A "starter" is not needed for a new septic system and additives are not needed for an operating system. A wide range of bacteria is already present in the sewage entering the septic tank. Those bacteria that are best adapted to the conditions in a septic system thrive in the septic tank and soil absorption field, treating the wastewater.

Septic tank additives are of no benefit. Some of them, especially solvents or petrochemicals, do not degrade easily and may damage the system or contaminate groundwater.

Additives that clean solids out of the tank may result in early absorption field failure. Money saved by not using additives will pay for regular septic tank pumping.

Are There Alternatives to Traditional Septic Systems?

Yes! If a site does not have enough deep, permeable, well-drained soil for a septic system, there may be several alternatives, depending on site conditions.

Lagoons. A lagoon is a constructed pond, 6 to 7 feet deep, surrounded by a berm, and fenced to prevent animals and children from entering. All wastewater is discharged into the lagoon where it is treated by bacteria. For slowly permeable, high-clay soil, it is an effective, inexpensive option. A good lagoon that is properly operated and maintained rarely has an offensive odor. A lot size of 2 to 3 acres or more may be required to adequately accommodate a lagoon and provide setback distances.

Alternative Systems. Onsite systems designed to pretreat wastewater before it is sent to an absorption field are called alternative systems. Options include mounds, aeration systems, sand filters, filters using other materials, and rock-plant filters. Although all onsite systems require some maintenance, the mechanical and electrical parts or vegetation in alternative systems mean that additional monitoring and maintenance is required for good performance. Having a contract for maintenance service with a provider such as an installer or manufacturer is strongly recommended. Except for mounds, all alternative systems in Kansas still require an absorption field following the system.

Mound. When the soil has a shallow depth to a restrictive layer, such as a seasonal high water table, rock, or slowly permeable layer, a mound may be a suitable alternative. A mound system consists of a layer of clean sand of a specific size on a prepared natural soil

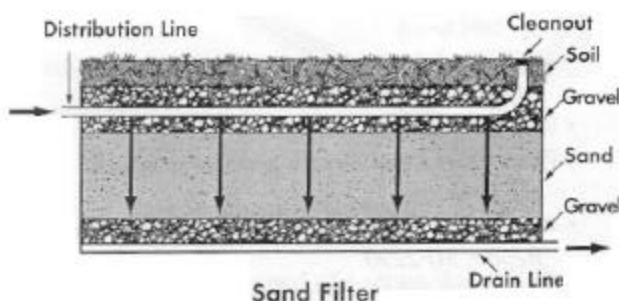
surface, and a pumped dosing system that applies the septic tank effluent over a distribution bed on top of the sand. Topsoil and grass cover the mound. Pump dosing of the distribution area is essential for uniform application to avoid overloading any one area. Mounds are limited to



slopes of less than 25 percent. A well-planned mound blends into the site and adds visual interest, but requires a site-specific design. The soil beneath the mound serves as the absorption field, eliminating the need for a separate field.

Sand Filter. A sand filter is similar to a mound but smaller, with the sides and normally the bottom of the sand bed lined with an impermeable material. Pre-engineered sizes and kit components enable easy installation, predictable costs, and a minimum of installation problems.

Systems similar to sand filters, but using expanded shale, peat, textiles, or other materials may also be used.



Aeration. An aeration system increases the rate of microbial activity in the wastewater by adding oxygen. The oxygen is added by injecting air into the wastewater or by spraying the wastewater through air. There are many manufacturers of these units. Be sure that the system that you select has good service support in your location and a good warranty. NSF International has a certification program for aeration units.

Rock-Plant Filters, sometimes called constructed wetlands, have been developed since 1980. Wetland plants are set into a bed of rock in an impermeable liner. Septic tank effluent flows through this treatment cell. Soil absorption can be in a conventional absorption field or a second unlined wetland cell. A healthy stand of wetland vegetation contributes to wastewater treatment and removal. Rock-plant filters require maintenance to keep the plants vigorous.

Other Systems. The onsite treatment field is changing rapidly with many new products being developed. Many show promising results. As with any other major purchase, check the information on performance, length of time it have been in use, and the reputation and experience of the manufacturer, dealer, and installer.

How to Avoid a Septic System Failure

Each septic system has a certain capacity. When this capacity is exceeded, there will be problems of effluent oozing to the surface or wastewater backup in the house. Reduction of water use relieves a primary cause of system failure and is a great benefit for onsite systems.

Discharge all wastewater from the home into the septic tank. Do not run laundry wastes directly into an absorption field, since soap or detergent scums and dirt may clog the soil pores, causing failure. Do not drain floor sumps or roof drains into the system. Only wastewater should go into the septic tank.

When selecting plumbing fixtures and water-using appliances, choose those that are water-efficient. Some toilets, shower heads, dishwashers, and washing machines use much less water than others.

Lagoon Maintenance. Lagoons operate best when the level of the wastewater is 3 to 5 feet deep. More water may have to be added to maintain this depth. Vegetation in the water, such as cattails and duckweed, must be removed for good operating conditions, reducing sludge accumulation, and preventing mosquito breeding. Berms should be planted with grasses that are mowed regularly.

Alternative System Maintenance. The manufacturer and installer should provide information on the maintenance requirements for your specific system. Maintenance can include testing pumps, alarms, and blowers for correct operation. Testing of dosing systems may include measuring squirt height of a water column from the end of a line to check for plugged orifices. Maintenance may involve back-flushing or brushing out the lines.

Good Septic System Performance May Require Learning New Habits

Taking Care of Your System

Pump the tank regularly to remove the sludge and scum. For example, about every 3 years, pump a 1,000-gallon tank serving a three-bedroom home having four occupants and limited use of a garbage disposal. See K-State Research and Extension publication, *Septic Tank Maintenance*, MF-947, for details.

Do not dump grease down the drain. It may clog sewer pipes or build up in the septic tank and plug the inlet. Use a separate container for waste grease and dispose of it in the trash.

Do not dispose of materials such as coffee grounds, cooking fats, bones, high wet-strength paper towels, facial tissues, or cigarette butts in the house sewer. These materials accumulate as solids in the septic tank and do not decompose readily, resulting in the need for more frequent tank pumping.

Modest amounts of household detergents, bleaches, drain cleaners, and other household cleaners do not harm the bacterial action in the septic tank. Do not put excessive amounts of any household chemicals down the drain. Avoid automatic toilet cleaners that contain chlorine.

To help avoid overloading the system, use water carefully. Turn off the faucet when not using the water. If the toothbrush is in your mouth or the razor is on your face, running water is being wasted and adding to onsite system load. Save laundry and dishes until you have enough to run a full load in the washing machine or dishwasher.

Softened water may cause problems in absorption fields installed in high-clay soils. The added salt in the water may reduce the permeability of the soil, shortening the life of the field. Returning the softener discharge to the septic system or only softening part of the water can reduce the impact of a water softener on a septic system.

What To Do Before Buying Real Estate

A home or building site not served by central sewer or a public water supply needs careful evaluation to avoid bitter consequences. When buying an existing home, get complete information about the existing water supply and wastewater system before completing the purchase. Find out exactly where the property boundaries, well, and wastewater systems are located. Be sure that the existing system meets all setback and separation requirements from wells, water lines, and property lines given in the sanitary code. An area meeting the same requirements should be reserved for a replacement field. Inspection by a trained person is essential to learn if the system meets the local code and state requirements.

Before buying a lot, determine the most desirable locations for your home, well, and wastewater system.

Evaluate the soil suitability on the site for building foundations, septic system or wastewater lagoon, roads, drives, and other uses. Remember that steep slopes, rock, high-clay soils, water bodies, stream floodplain, and marshy areas will cause construction and drainage problems. Before finalizing any purchase contract, check with the appropriate office to find out what permits are needed, including a permit to install the wastewater system. Consider making the purchase of the property contingent on locating an adequate site for a reasonable cost wastewater system and a sufficient source of safe drinking water.

Sources of Additional Information

- Local Health Office or Zoning/Planning Office
- County K-State Research and Extension Office
- KSU, Extension Biological and Agricultural Engineering
- Kansas Department of Health and Environment
- Local Natural Resources Conservation Service/County Soil Conservation District Office

The following K-State Research and Extension publications are available from your county Extension office, local health office, or from K-State Research and Extension Distribution Center, 24 Umberger Hall, Manhattan, KS 66506-3402 (785) 532-5830

- *Septic Tank Maintenance: A Key to Longer System Life, MF947*
- *Why Do Septic Systems Fail?, MF946*
- *Wastewater Pond Design and Construction, MF1044*
- *Wastewater Pond Operation, Maintenance and Repair, MF2290*
- *Rock-Plant Filter Design and Construction for Home Wastewater Systems, MF2340*
- *Rock-Plant Filter Operation, Maintenance, and Repair, MF2337*

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Kansas State University Agricultural Experiment Station and Cooperative Extension Service

MF-2179 (Revised)

October 2000

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Household Hazardous Waste Program

(A Free Service to Butler County Residents)



Collected the 1st Saturday of Each Month
Open 8:30 AM until 12:30 PM
(Or By Appointment)
Located at the Butler County Landfill
(SW 40th and Boyer Road)

- 🌍 Paint
- 🌍 Paint Thinners
- 🌍 Paint Strippers
- 🌍 Household Cleaners
- 🌍 Motor Oil

- 🌍 Lawn & Garden Chemicals
- 🌍 Aerosol Cans
- 🌍 Batteries
- 🌍 Rodent Poison



Recycling Program

Bring your recyclable materials to the Butler County Landfill. A recycling trailer is available there and is open from 8:30 AM to 5:30 PM, Monday through Saturday.

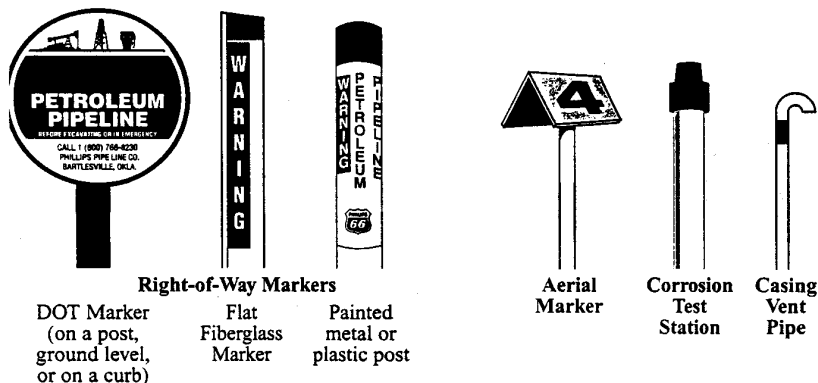


For More Information, call the Solid Waste Coordinator at 316-320-1453

PIPELINE SAFETY AND AWARENESS

Several pipelines criss-cross Butler County. These pipelines carry oil and natural gas. Any leak in a pipeline can have serious environmental impacts. The quicker a pipeline leak is reported, the sooner authorities can get to the site to fix the leak and minimize damage to the environment.

Markers identify pipelines that run through Butler County. These markers help identify the approximate location of the pipeline. The markers list the commodity transported, the company name and a 24-hour telephone number. Look for these markers:



How to Identify a Pipeline Release:

Sight:



- Accumulation of petroleum products on the ground.
- A dense white cloud or fog.
- A spot of discolored or dead vegetation.
- A rainbow colored sheen on the surface of water.
- Fire and smoke if the petroleum product has ignited.

Sound:



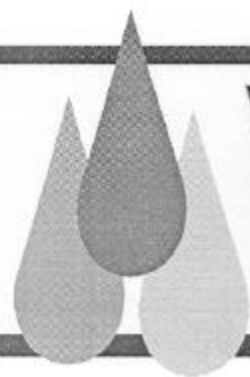
- Listen for unusual noises - a slight hiss to a roaring sound, depending on the magnitude of the leak.

Smell:



- Any strange or unusual odor can be an indication of a leak. Each petroleum product has its own characteristics.

This information courtesy Phillips Pipe Line Company



WATER

QUALITY SERIES

Plugging Abandoned Wells

A source of clean, safe household water is important to all Kansans. Groundwater is often the only source, especially in areas with no public water supply. Groundwater is usually preferred for individual homes because it does not require filtering.

Groundwater use does require wells, and wells act as conduits for possible entrance of contaminants. Many test holes and unused (abandoned) wells are located in fields, farmsteads, industrial sites, and urban areas without being properly plugged. Not only are wells sources for potential contamination of groundwater, many are a physical hazard to animals and people, particularly children (see photo).



A 6-year-old child can easily slip through a section of 10-inch PVC pipe.

Landowners are liable for contamination or injury from unplugged wells or holes. The hazards of abandoned wells and test holes should concern everyone. They should be properly eliminated. This bulletin is provided to help landowners, service providers, and others understand the correct plugging procedure.

The Kansas Department of Health and Environment (KDHE) estimates more than 250,000 abandoned wells and test holes exist in Kansas. Kansas law defines an abandoned well as one that

- has not been used during the last 2 years;
- is in such disrepair that it cannot be used; or
- poses a groundwater-contamination hazard.

Kansas law requires that all abandoned wells and test holes be properly plugged. Proper plugging accomplishes five goals:

- restores protective barrier to minimize groundwater contamination;
- removes physical hazards by removing tempting openings for curious children and animals;
- restores stability to the land surface, (load carrying capacity);
- eliminates or reduces liability exposure; and
- protects and improves property values.

Kansas Regulations

The Kansas Department of Health and Environment administers laws regulating construction, reconstruction, and plugging of wells. Articles 12-K.S.A.82a-1212 and 1213 and 30-K.A.R. 28-30-4(a) and 28-30-7 specifically address plugging of abandoned wells. The regulations provide instructions for all types of wells and aquifer conditions. Well drillers and landowners alike are required by law to follow these procedures, which are available from KDHE.

This publication describes the easiest plugging procedure for the most-common well and aquifer conditions. If well or aquifer conditions are unknown or different from those described, landowners should contact KDHE for the proper plugging procedures. Landowners may plug wells on their property by following these procedures. Landowners also can hire a licensed water well contractor to plug a well.

The plugging procedure requires a plugging report (form WWC-5 or form WWC-5P) be filed with KDHE. These forms can be obtained by calling (785) 296-5524

and are frequently available locally through county health or Extension offices. Failure to file this report documenting proper closure leaves the owner liable for contamination. Documentation of the plugging procedure transfers the burden of proof to the complainant.

Aquifer Classification

Often times for older wells, little specific information is available about the well or the aquifer source. The type of aquifer or water formations penetrated by the well must be known for proper plugging. Sometimes this information can be obtained by asking questions of knowledgeable sources. Well logs for the actual well or nearby wells may be available from local drillers or KDHE. Geological and groundwater reports are available for most counties. Check the library or call the Kansas Geological Survey at (785) 864-3965.

A little must be known about the soil and geology (sand, gravel, clay, rock) of the well in order to ensure plugging will restore the integrity of the formation. Aquifers, the permeable water-bearing materials supplying a well, are classified based on the geology of the formation.

When water from the surface moves directly into an aquifer, it is called unconfined. Confined aquifers, on the other hand, have impervious layers that significantly restrict direct local recharge from the surface. Water in confined aquifers may be under pressure greater than atmospheric, and water rises above the restricting layer (artisan).

When the water-bearing layer is made up of individual grains of sand and gravel, the aquifer is called unconsolidated. All other aquifers are considered to be consolidated aquifers, often referred to as rock aquifers. Thus, there are four types of aquifers: unconfined-unconsolidated, unconfined-consolidated, confined-unconsolidated, and confined-consolidated.

Many aquifers are more complex than this simplified explanation. A consolidated formation may have several water-bearing zones separated by confining layers of varying permeability. Each zone may have a different yield and

water quality. Good quality may lie above, below, or between zones of poor-quality water. Experienced well drillers recognize and note these differences as the well is drilled and connect or exclude various zones, based on the quality and quantity of water needed.

The procedure described here applies when plugging wells located in unconfined aquifers with unconsolidated formations. If it is suspected the formation is rock (consolidated formation), has confining layers, or the well penetrates multiple water-bearing formations, contact KDHE before proceeding or hire a licensed well driller to do the plugging. Do not attempt to use these procedures to plug wells in conditions other than unconfined and unconsolidated.

The procedure described generally applies to the sand and gravel aquifers shown in Figure 1. Other areas may not be sand and gravel aquifers. Generally, shallow wells (less than 50 feet near streams and 100 feet on uplands), can be plugged with this procedure. Large-diameter (12 inches or more) irrigation, industrial, or municipal wells also might be best handled by a licensed well driller.

Well Classification

Wells are classified according to construction. Understanding well construction methods is important because different types of wells require different plugging procedures. The oldest type is the dug well. These are large diameter, relatively shallow, hand-dug wells, usually lined with rock or brick. Typical dug wells are 3 to 6 feet in diameter and 15 to 50 feet deep (see Figure 2). The depth depends on depth to water, and size can vary from 2 feet in diameter to larger than 30 feet.

A driven well, used mainly for shallow, unconsolidated aquifers, is named for the process of driving the suction pipe with screened section into the sandy water-bearing formation. These wells are generally small in diameter with pipe sizes of 1 to 2 inches for home water supplies and up to 6 inches for irrigation and livestock wells. Driven wells are limited to sandy formations with high water tables,

Figure 1. Sand and Gravel Aquifers

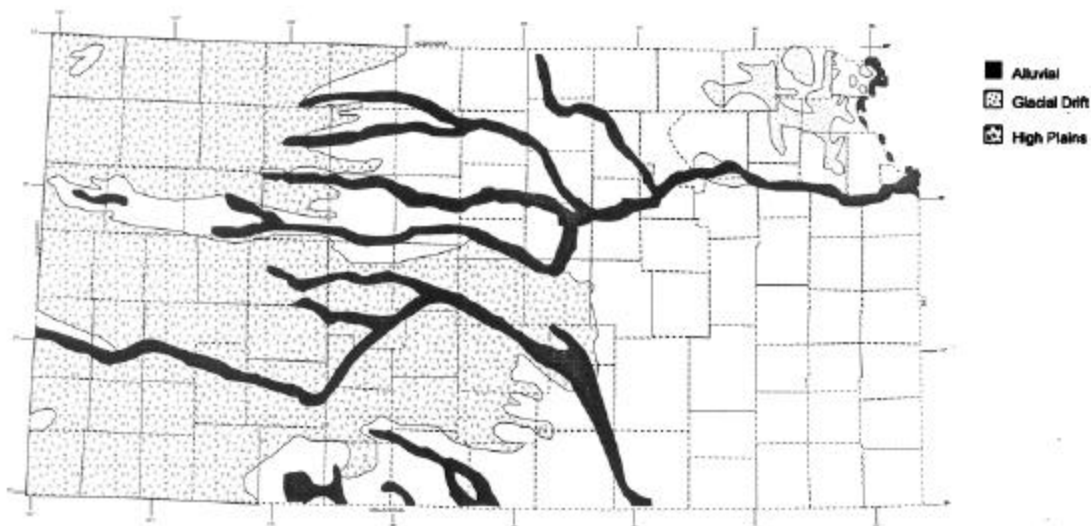
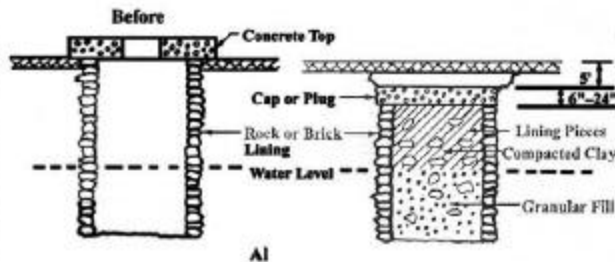


Figure 2. Plugging Diagrams for a Hand-dug Well



where centrifugal or shallow well jet pumps can be used. Driven or sandpoint wells are still being installed. To be legal, however, they must be grouted to a depth of 20 feet or to the water table. Because of shallow depths and grouting difficulties, they are discouraged for domestic use.

The drilled well is the most common type of well in Kansas (see Figure 3). Typically, a hole is drilled into the aquifer, and a casing 3 to 8 inches smaller than the bore hole is installed. Domestic and livestock watering wells are generally 4 to 10 inches in diameter, while irrigation wells generally range from 10 to 18 inches.

The depth of a drilled well varies depending on the aquifer and water depth. Depths greater than 300 feet are common in some places. The small-diameter well casings, usually 6 inches or less, are generally installed in bore holes only a few inches larger than the casing. Typically, the casing is inserted after the bore hole is drilled.

For large-capacity wells for irrigation, industrial, or municipal uses, the casing is installed into oversized holes. The space between the casing and bore hole is filled with gravel. This gravel pack allows unrestricted water flow into the perforated portion of the casing and acts as a filter to retain the aquifer particles. Near the surface, this space is filled with grout to prevent water movement from the surface along the casing.

Prior to 1975, grouting was not required and the common practice was to gravel pack to very near the surface to induce the greatest yield possible. This practice made flow along the outside of the casing an easy pathway for contaminants to enter the groundwater from the surface.

Plugging Procedure

The plugging procedure described is for wells in an unconfined-unconsolidated aquifer (figures 2, 3, and 4). If the well has more than one water-bearing layer, penetrates a confining layer (aquiclude), or is into rock, contact KDHE to make certain of the proper plugging procedure or hire a licensed well driller. Plug wells using these steps:

Step 1. Prepare site. Remove all pumping equipment and any foreign objects from the well and remove debris from the surface around the well site.

Step 2. Remove top of casing. Excavate around the casing of a drilled or driven well to a depth that allows the casing to be cut off at least 3 feet below the surface. The more casing removed the better.

Figure 3. Plugging Diagram for a Drilled Well in an Unconfined-unconsolidated Aquifer

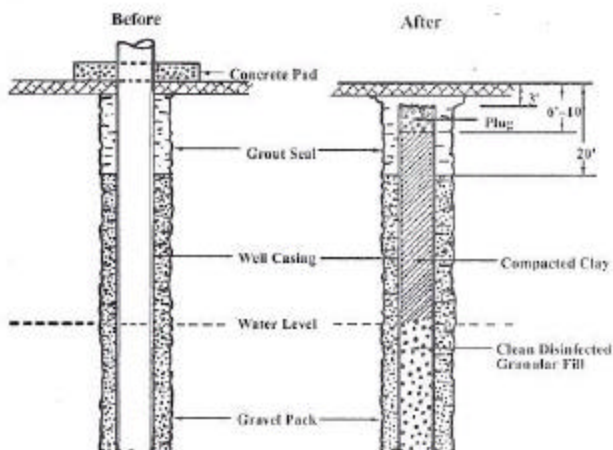
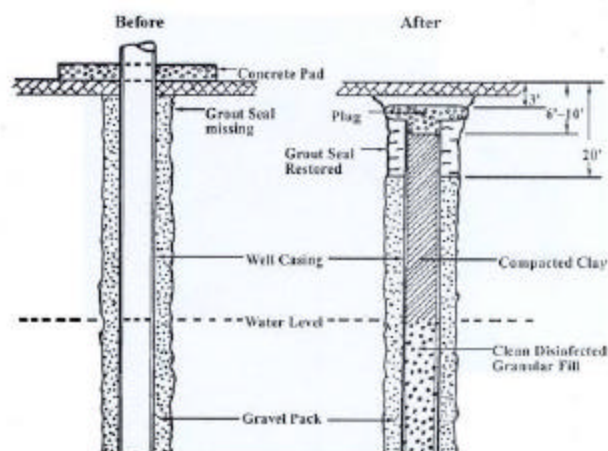


Figure 4. Plugging Diagram for a Drilled Well Without Proper Grouting in an Unconfined-unconsolidated Aquifer



When excavating around the old casing, look for evidence that the well was properly grouted (Figure 3). Establishing a proper seal is critical to preventing contaminants from migrating along the outside of the casing. When a well does not have a proper grout seal, it should be restored. This requires 20 feet of excavation around the outside of the casing to allow placement of the grout. However, if it is possible to excavate this deep, the casing should be removed to this depth rather than be grouted.

Since deep excavation of a nongrouted well is often not practical, another option is to extend the plug beyond the edges of the original bore hole at least 1 foot outside the casing in all directions. This mushroom plug, shown in Figure 4, will help prevent water movement along the out-

side of the casing. Deeper excavation than the 3-foot minimum around the casing is especially desirable when no grouting exists outside the casing.

In dug wells, the casing of the well is the rock or brick lining of the well. This lining can be used as part of the fill material. The lining for dug wells should be removed to a depth of at least 5 feet. Be certain to mix lining material with fill material (see steps 4 and 5).

Step 3. Disinfect water. Existing bacteria or bacteria carried to the water by the fill material should be killed. This helps prevent contamination of nearby wells. Determine the amount of chlorine necessary by measuring the depth of water and diameter of the well and estimating the amount of water in the well. Then use Table 1, which lists the amount of chlorine product to add to produce a solution concentration in the well of approximately 500 milligrams per liter of chlorine.

The amount of chlorine needed depends on the product concentration. Four concentrations representing various chlorine products from household bleach (5.25 percent) to dry chlorine disinfectant (70 percent) are shown in Table 1. When dry chlorine is used, dissolve it in water before adding it to the well to make certain the material does not settle to the bottom.

If no working wells are within 100 feet of the abandoned well being plugged, the concentration of chlorine could be halved since bacteria migration beyond 100 feet is unlikely.

Example: A 6-inch diameter well, 60 feet deep, has 20 feet of water present. How much chlorine is needed for disinfection?

At the intersection of the 6-inch and 5.25-percent column in Table 1, 1.8 fluid ounces of bleach is needed for each foot of water, so 36 ounces, or 2.25 pints, (1.8×20) of bleach should be added.

Step 4. Fill water zone with clean porous material. Approved fill material is sand and gravel of less than 1-inch diameter. Generally the preferred fill is washed, coarse river sand. The fill material is chlorinated when it is added to the previously disinfected water in step 3.

Table 1 also shows the volume of fill needed per foot of well for various diameter holes. The water in the well may rise as the sand is added, depending on the permeability of the formation and the fill material. Estimate the volume of fill needed to avoid filling above the normal water level. Measure the normal water level using a weighted string that just touches the water surface. Mark the string with a knot at the top of the casing. Begin adding fill, but periodically check progress of the fill. Once the weight touches the top of the fill at the marked spot, stop adding fill. Even though the water level may have risen, add fill only to the original water level. Any water above the normal water level should be removed by pumping or allowed to soak away with time. The use of coarse sand and slow addition to the well will prevent bridging of the sand at the water surface. The sound of the sand hitting the water surface should be heard.

In dug wells, more fill than predicated from the table generally is required to fill this zone because mud in the bottom of the well compresses and voids in the rock lining. It may be necessary to bring as much as 30 percent more fill than predicted from the table.

Table 1. Computing Volume of Fill Material and Disinfectant for Wells

Diameter of opening	Volume of well per foot		Amount of product to disinfect 1 foot ^(a)			
			Liquid chlorine (fluid ounces)		Dry chlorine (dry ounces)	
	gal/ft	ft ³ /ft ^(b)	5.25%	10%	65%	70%
2 inches	0.16	0.02	0.20	0.10	0.02	0.02
3 inches	0.37	0.05	0.45	0.22	0.05	0.02
4 inches	0.65	0.09	0.80	0.42	0.07	0.07
5 inches	1.02	0.14	1.25	0.65	0.10	0.10
6 inches	1.47	0.20	1.80	0.95	0.15	0.15
8 inches	2.61	0.35	3.20	1.67	0.27	0.25
10 inches	4.08	0.55	5.00	2.60	0.42	0.40
12 inches	5.88	0.79	7.20	3.75	0.60	0.55
14 inches	8.00	1.07	9.77	5.12	0.82	0.77
16 inches	10.44	1.40	12.77	6.67	1.07	1.00
1.5 feet	13.22	1.77	16.17	8.45	1.35	1.25
2.0 feet	23.50	3.14	28.75	15.05	2.42	2.25
2.5 feet	36.72	4.91	44.92	23.50	3.77	3.50
3.0 feet	52.88	7.07	64.70	33.85	5.42	5.05
4.0 feet	94.00	12.57	115.02	60.15	9.65	8.97
5.0 feet	146.9	19.64	179.75	94.00	15.07	14.00
6.0 feet	211.5	28.27	258.75	135.37	21.72	20.17
7.0 feet	287.9	38.48	352.25	184.25	29.55	27.45
8.0 feet	376.0	50.27	460.25	240.65	38.60	35.85
9.0 feet	475.9	63.62	582.25	304.50	48.87	45.37
10.0 feet	587.5	78.54	719.00	376.00	105.32	96.02

^(a) 500 mg/L concentration of chlorine; 128 oz. = 1 gallon

^(b) 27 ft³ = 1 cubic yard

Although the lining rocks can be added in either the sand or subsoil layers, it is preferable to add with the subsoil as discussed later. This will keep the water-bearing area much cleaner, as it is difficult to remove the rock lining without a lot of debris from the surface falling into the well.

In some wells, especially those less than 20 feet deep, there may not be enough volume to dispose of the rocks in the subsoil layer only. In this case, some of the rock lining should be placed in the fill. Generally, the rock or brick lining can be pried loose with large pry bars. However, a backhoe or front-end loader may be desirable for large-diameter wells. When using heavy equipment, the surface soil around the well site should be scraped away to expose the subsoil layer. As the rock walls are added, be certain to add sufficient fill material to eliminate any voids among the rocks.

Example: For the 6-inch diameter well with 20 feet of water, how much sand is required?

From Table 1, at the intersection of 6-inch diameter and the column from the left side, 0.20 cubic foot of fill is needed for each foot of the 20-foot water zone, therefore, 4 cubic feet ($0.20 \text{ ft}^3/\text{ft} \times 20 \text{ ft}$) of fill is needed. Since there are 27 cubic feet per cubic yard, 4 cubic feet equals 0.15 cubic yard.

Step 5. Add compacted subsoil above the water zone.

The casing above the water level is filled with natural subsoil clay material (subsoils low in organic matter and other potential contaminants) and compacted to form a solid column. The subsoil should be placed in a dry hole. The subsoil should be damp to allow it to compact easily. The clay fill should be placed in layers not exceeding 2 feet.

For small-diameter wells, a section of steel pipe with a cap on one end attached to a rope makes a good tamping tool. The fill should stop at least 3 feet below the top of the casing (6 feet below the surface) to leave adequate space for an approved plug.

Dug wells are filled to no more than 5 feet below the surface. At this point, the rock lining and subsoil fill should be leveled off.

Step 6. Place approved grout plug. Pour the approved grout material into the drilled or driven well casing making a plug at least 3 feet thick, the minimum required. In a dug well, the plug of approved grout material is 6 to 24 inches thick. KDHE-approved grout material includes commercial hole plug sodium bentonite clay, cement, and neat cement. Cement grout is a mixture of equal volumes of portland cement and sand. Use 10 to 12 gallons of water for each bag of cement. Neat cement is a mixture of portland cement and water, and 5 to 6 gallons of water should be used for each 94-pound bag of cement.

Sodium bentonite clay, normally sold in 50-pound bags that contain 0.7 cubic foot, is recommended for use because it is easy to handle, remains pliable, and expands when in contact with water. Because of bentonite's expansive and pliable nature, it will conform to the uneven rock edges and expand to fill voids in the wall. If any settlement should occur, the bentonite seal will not crack or lose its integrity.

Table 2 provides information to help determine the number of bags of sodium bentonite clay needed for placing the plug or filling the entire well with bentonite. A cement

Table 2. Number of Bags of Sodium Bentonite Clay Needed for Various Well Diameters

Diameter of opening (inches)	Feet of fill per bag ^(a)	Bags ^(a) per foot	Bags ^(b) per 3-foot plug
2	35.0	0.03	0.1
3	14.0	0.07	0.2
4	7.8	0.13	0.4
5	5.0	0.20	0.6
6	3.5	0.29	0.9
8	2.0	0.50	1.5
10	1.3	0.79	2.4
12	0.9	1.13	3.4
14	0.7	1.53	4.6
16	0.5	2.0	6.0
18	0.4	2.5	7.5

^(a) Table values based on 50-pound bags, which have a volume of 0.7 ft³ per bag.

^(b) Additional bags are required for mushroom plugs extending outside the casing (see step 6).

plug must be much thicker and may need reinforcing to have enough strength to prevent cracking and collapse.

Example: A 6-inch diameter well is ready for the plug material. How many bags of bentonite are needed?

From Table 1, a 6-inch diameter well has a volume of 0.2 cubic feet per foot of casing. A typical bag of bentonite contains 0.7 cubic feet of material. Dividing 0.7 cubic feet per bag by 0.2 cubic feet equals 3.5 feet of casing per bag. Therefore, one bag will make a 3.5-foot plug inside the well casing. Several more bags will be needed to make the mushroom plug on top to protect the outside of the casing (see step 2).

Example: A 4-foot diameter well is ready for the plug material. How many bags of bentonite are needed?

Since bentonite is expansive, the minimum 6-inch plug will be used. Remember, the plug should extend beyond the rock lining to the original hole diameter. For this example, assume the rock lining is 1 foot thick; therefore a 6-foot diameter plug must be placed.

From Table 1, a 6-foot diameter hole requires 28.27 cubic feet of material. Since only a 6-inch plug is required, only 14.14 cubic feet of material is needed. Dividing 14.14 cubic feet by 0.7 cubic foot per bag determines that 20.2 bags (round up to 21 bags) are needed.

Step 7. Fill hole at top. Once the grout plug and mushroom cap have been completed, the remaining hole above the plug should be filled. Subsoil material can be placed in the bottom of the hole and compacted as the fill progresses in layers of 6 inches. Topsoil should be used in approximately the top foot of the hole. The fill should be mounded up at least 10 inches in the center to allow for settling and drainage away from the fill site.

Step 8. File the plugging report. Abandoned wells are an environmental and safety hazard. They are a liability. Following the plugging procedure described here and filing form WWC-5P or WWC-5 with KDHE to document the action minimizes further liability.

The well is not legally plugged until the form is filed. WWC-5 is the form used by drillers for reporting a new well.

It asks for location, property owner, physical characteristics of formation, well, casing, and the plugging procedure used. A new WWC-5P form was developed specifically for reporting well plugging. Forms are available from KDHE, but many county Extension, county health, and conservation district offices also have these forms available.

Alternative Plugging Option

For small-diameter wells, especially shallow ones, it is simpler to plug the entire casing with approved grout material or with sand fill below water and grout above water. This is a good choice for very-small-diameter wells where placement of the various layers of fill especially the subsoil fill, may be difficult. Filling the entire casing with grout may be the best option for small-diameter driven wells. A 2-inch diameter well needs only 0.02 cubic foot of fill per foot of casing. This means one bag of bentonite will fill 35 feet of well. The well water still needs to be chlorinated.

Sodium bentonite clay chips or pellets can easily be used to completely fill the casing. Bentonite clay powder or granular should never be poured into wells with water. Proper placement of powder or granular materials requires making a slurry and using a grout pump.

Placing cement grout into water. If cement or neat cement is used as grout, placement into water requires special procedures to avoid separation. A tremie pipe, which is usually about 3 inches in diameter and in sections of 5 to 10 feet long, will be needed to place the cement without passing through water. Use enough pipe to reach within a foot or two of the bottom and cut the end at a 45-degree angle. A hopper box or large funnel is attached to the top of the tremie pipe. The grout is mixed and placed in the hopper or funnel.

The mix must be thin enough to flow, but thick enough to set properly once in place. The proper ratio for neat cement grout is one 94-pound bag of cement to 5 or 6 gallons of water. For cement, use 5 or 6 gallons of water for each cubic foot of cement-sand mix. The volume of material must be monitored during placement because the tremie pipe is raised as the fill progresses. The end of the tremie must be kept below the surface of the grout at all times to prevent dilution and separation of the grout mix.

Precaution: Remember how much material is in the tremie pipe at all stages and approximately how much depth it will fill. A 10-foot section of 3-inch diameter tremie contains nearly a half a cubic foot, so 100 feet would contain 5 cubic feet. If filling an 8-inch casing, which contains 0.35 cubic feet per foot of length, ignoring the volume in the tremie would be an error of 14.3 feet. Tag or measure the progress of the plugging material as the well is filled, and pump or siphon off any excess water that is displaced as the grout is added.

Plugging Confined, Multiple-zone or Rock Aquifers

If the aquifer is known to contain confining layers or more than one water-bearing zone, a plug at each confining layer between each aquifer is required. If the outside of the casing was not grouted at those locations, as is common with old wells, the casing should be ripped and grout pumped into the gravel pack to restore a good seal at the confining layer. Most licensed well drillers have equipment to rip or puncture casing so grout can be forced into the gravel pack. Landowners are advised to hire a competent licensed water well driller to plug all confined, multiple-zone or rock aquifers and other unusual formations. In addition to having needed equipment, a driller should know the local geology, so grout plugs and other materials are placed correctly.

Oil and Gas Wells

Plugging abandoned oil, gas, or brine-disposal wells is equally important. Report these wells to the Kansas Corporation Commission to assure they are properly plugged. The KCC's district offices are in Dodge City, (316) 225-8888; Wichita, (316) 337-6231; Chanute, (316) 431-6946; and Hays, (785) 628-1200.

Conclusion

Abandoned wells are potential sources of direct contamination of valuable groundwater. Wells larger than a few inches in diameter also are a safety hazard for children and animals. All abandoned wells should be properly plugged to prevent contamination and eliminate the safety hazard. Plugging is required by Kansas law. When a replacement well is drilled, the old well, according to law, must continue to be used, upgraded to current standards, or plugged. It is not uncommon to visit a farmstead and find three or four wells with only one or perhaps two currently in use. While there is a reluctance to pay to get rid of something that has outlived its usefulness, groundwater protection, safety, and Kansas law make plugging important. Abandoned water wells can no longer be ignored.

Related References:

Plugging Cisterns, Cesspools, Septic Tanks, and Other Holes, K-State Research and Extension Publication MF-2246.

Plugging Packet, Kansas Department of Health and Environment.

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Extension Irrigation Engineer

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Kansas State University Agricultural Experiment Station and Cooperative Extension Service, Manhattan, Kansas

MF-935 (Revised)

January 1998

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File Code: Engineering 4-5 (Water Quality)

MS 1-98-9M

WATER

QUALITY SERIES

Plugging Cisterns, Cesspools, Septic Tanks, and Other Holes

Many rural homesites, farmsteads, and older homes have used underground holes to store water (cisterns) or dispose of waste (cesspools, septic tanks, and seepage pits). These holes are safety hazards for people and animals and potential routes for possible groundwater contamination. When these features are no longer used and there is no specific plan for future use or they are not suitable for future use, they should be properly plugged to eliminate the hazard.

It is the responsibility of the landowner to provide safety and protection of groundwater through plugging of cisterns, cesspools, septic tanks, and other holes. This bulletin presents the best procedures to eliminate these holes.

Origin of cisterns, cesspools and other holes

Historically, homes located where groundwater was not readily available depended heavily on roof runoff collection and cistern storage for household water. Many cisterns are unused today because homesites are now served by other water supplies. The cistern may pose environmental and safety hazards in much the same manner as an abandoned well.



This open cesspool is a serious potential safety hazard.

Although now illegal, wastewater has often been disposed of in a cesspool or dry well. Construction was similar to a shallow dug well lined with bricks or stone. It was often 6 to 10 feet in diameter and 15 to 20 feet deep. The depth was less than that of groundwater, thus the name "dry" well.

Cesspools are a serious potential source of groundwater contamination and a definite safety hazard.

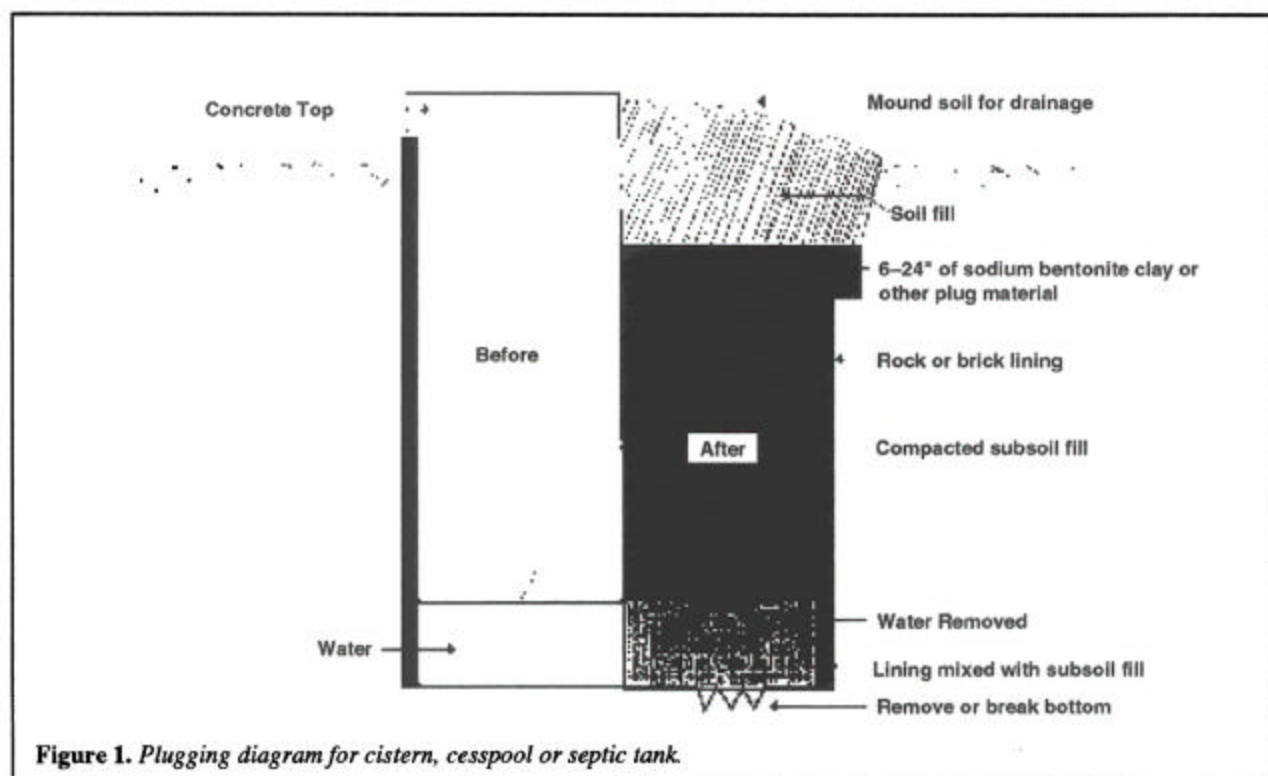
In the past, Kansas law permitted seepage pits following the septic tank for wastewater disposal. These were holes in the ground filled with stone or other inert material such as broken brick. They were constructed according to state guidelines for size and depth. Construction of seepage pits has been illegal since May 1996, and existing pits must be properly disposed of whenever they are not used or not working.

Plugging highly recommended

It is strongly recommended that unused cisterns, cesspools, septic tanks, pits, or other holes in the ground be given the same consideration as abandoned wells. Although not as deep, these excavations create the same environmental concerns as dug wells. They should be properly eliminated of by plugging or filling following recommended procedures and approved materials. The Uniform Plumbing Code, Sec. 722, states that *every cesspool, septic tank, and seepage pit that has been abandoned or is not used shall have the contents and top removed, and then be filled with earth, sand, gravel, concrete or other approved material. When abandoned in conjunction with connecting to a public sewer, filling shall occur within 30 days.* Proper closure eliminates the following situations:

- safety hazard from possible collapse of the top or opening
- possible future problems with structural integrity for any construction on top of or adjacent to the structure
- a possible pathway of groundwater contamination
- liability exposure for safety or groundwater contamination from unplugged holes

By following the well-plugging procedure these concerns will be satisfied with permanent disposal of the unused or abandoned structure. Though this plugging



procedure is a permanent solution, there may be special cases where a less permanent solution may be appropriate for a cistern as discussed later in the section on filling inactive cisterns.

The procedures discussed in this bulletin apply only to holes located at single-family residences and used only for storage or disposal of water or wastewater. Any tank or cavity used for storage of petroleum products or other chemicals requires Kansas Department of Health and Environment (KDHE) contact and procedures. Other KDHE programs such as the underground injection control (UIC) program could require other procedures. Closure of a cesspool, seepage pit, septic tank, or other hole that has received sewage, may be subject to city or county code through local health, environmental, or other agencies. Check with local agencies to determine if they have rules or assistance programs.

Procedure for plugging holes

The plugging procedure described here follows the well-plugging rules established by KDHE for dug wells and is illustrated in Figure 1. This procedure is recommended for plugging non-well holes deeper than 10 feet. Plugging a cistern, cesspool, septic tank, or other non-well hole is not addressed in Kansas law or regulations, thus no plugging report is required. The plugging procedure described in this bulletin would be most suited for deep (greater than 10 feet) and small-diameter (less than 8 feet) holes.

However, if the structure intercepts groundwater, regardless of how it was used, it is a well, and all requirements used for well plugging must be met including filing the WWC-5 or WWC-5P report with KDHE. These forms can be obtained by contacting the KDHE at (785) 296-5545.

Step 1: Remove water and organic debris. Pump any water, semisolid, or solid organic material from the cistern, cesspool, septic tank, or other hole. Organic solids, semi-solids, or liquid material should be disposed of in a permitted wastewater-treatment facility or properly land applied according to current regulations. Pumping should be done by a licensed seepage hauler unless the property owner has the proper equipment and does the work.

Note: Is the hole acting as a well? Sometimes cisterns, cesspools, septic tanks, or other holes might contain water either seasonally or continually. If water returns after being pumped, it is a well and should be plugged as a well following procedures outlined in Extension bulletin MF-935, *Plugging Abandoned Wells*, available at County Extension offices.

Step 2: Clear debris. Remove all hardware and foreign material or debris from the hole and remove debris from around the site. Remove any buried non-masonry or stone device, such as a car or truck body, used as the walls of the seepage pit.

Seepage pits or other filled holes constructed following old Kansas rules have their interior filled with chunks of masonry, stone, or other inert nondegrading material. It is not practical to remove this fill material, so it should remain in place. As stated earlier, car bodies or other cavity devices or structures used for seepage pits must be removed. They should have all piping entering or exiting the hole removed or plugged.

Step 3: Puncture the floor. It is important that water not accumulate inside a cistern or other structure to form a perched water table. Removing the floor is preferred, but drilling or breaking the floor is usually adequate to allow drainage and prevent any accumulation of water after plug-

ging or filling. Floors should not be present in cesspools, seepage pits, or most other holes.

Step 4: Plug/fill the structure. Plug the cistern, cesspool, or septic tank with local low-organic-matter subsoil (usually natural clay) material. Be sure this material contains no other potential contaminants and is moist enough to compact easily. The clay should be placed in layers of 6 inches to a foot (no more than 2 feet) and compacted to prevent settling. Some form of mechanical compacting should be used. Stop when the fill is within 5 feet of the surface.

The lining of the cesspool or cistern can be used as part of the fill. In some cases, however, there may not be enough volume to dispose of the lining in the hole. In this case, the excess lining should be removed. Generally, a rock or brick wall and mortar lining can be pried loose with large pry bars. However, a backhoe or front-end loader may be desirable for large structures. When using heavy equipment, the surface soil around the hole should be scraped away to expose the subsoil layer. As the rock walls are added to the fill, be certain to add sufficient fill material to eliminate any voids around the rocks.

Step 5: Place grout plug. Level the lining at the desired depth, which usually is 5 feet below the surface, and complete the subsoil fill up to this same level. The structure is now ready for the plug of approved grout material which should be 6 to 24 inches thick. Sodium bentonite clay is recommended.

Because of bentonite's expansive and pliable nature, it will conform to the uneven edges and expand to fill voids. If any settlement should occur, the bentonite plug will not crack or lose integrity as a seal. Cement also is an approved plug material. A cement plug must be much thicker and should be reinforced to have enough strength to prevent cracking and collapse.

A low water to cement ratio (max 0.5) with an ultimate design strength of at least 3,500 pounds of strength should be used. The following is an example of a cistern or cesspool grout plug procedure.

Example: A 6-foot inside diameter lined hole is filled and ready for the plug material. How many bags of bentonite are needed?

Since bentonite will expand, the minimum 6-inch thick plug will be used. Remember, the plug should extend beyond the lining of the original hole diameter. For this example, assume the brick lining is 4 inches thick and has an equal width of loose fill outside the brick lining. The plug needs to extend beyond into undisturbed soil, therefore, an 8-foot diameter plug will be placed. From Table 1, an 8-foot diameter hole requires 50 cubic feet of fill per foot of depth. Since only a 6-inch plug is required, only 25 cubic feet of material is needed. Dividing 25 cubic feet by 0.7 cubic feet/50-pound bag determines that 36 bags of bentonite are needed.

The grout seal can become very expensive for large diameters. Since this is recommended rather than required, a substitute for an approved grout would be any natural high-clay-content, low-organic-matter, and low permeability subsoil. A natural clay plug should be at least 2 feet thick. It should be thoroughly wet and compacted as placed.

Table 1

Volume per Foot of Depth for Round Holes

Diameter of Opening	ft ³ /foot of fill
3 ft.	7.1
4 ft.	13
5 ft.	20
6 ft.	28
7 ft.	38
8 ft.	50
9 ft.	64
10 ft.	79
11 ft.	95
12 ft.	113
13 ft.	133
14 ft.	154

27 ft³ = 1 yard 1 50-lb. bag of bentonite = 0.7 ft³

Step 6: Restore surface grade. After placement of the grout seal, fill the remainder of the hole with soil. The top foot or so should be topsoil. Mound the fill at least 10 inches above the surrounding surface to allow for settling and to prevent surface water ponding.

Temporary fill for inactive cisterns

Using a filling procedure described as follows is not suitable for a cesspool, septic tank, or for other holes that received sewage. Use the plugging procedure presented previously for permanent disposal of these holes.

In cases where specific conditions occur, a cistern can be safely filled and still comply with safety and potential groundwater contamination concerns. The owner must understand that filling is a temporary fix, and construction should never occur over a filled cistern. Furthermore, construction also is discouraged adjacent to a filled cistern. The only situation where filling may be suitable is when all of the following conditions are satisfied. The filling procedure assumes the top of the cistern will remain intact rather than being completely removed.

- At least 4 feet of medium-or fine-texture soil (silts and clays) separate the bottom of the cistern from groundwater or permeable material such as sand, gravel, or fractured rock.
- The cistern sides and top are leakproof (no cracks or joints) and structurally sound. Generally, the cistern must be of high-quality reinforced concrete to meet this requirement. A good test for structural quality is to remove the cover and hit the riser hard with a heavy hammer (6 pounds or more). If no cracks or breakage occur, it passes the test.
- The cistern has not received any waste material in either solid or liquid form.
- No future construction will ever be done near or over the cistern.

If all of these conditions are satisfied, the cistern may be filled following this procedure. However, the owner must understand that this is not a permanent solution, and the proper plugging procedure may be required in the future if a structure is to be built or the cistern structure becomes leaky.

Step 1. Remove water and sediment. All water, sediment, and other debris must be removed from the cistern before beginning. Because roof runoff contains some sediment, it is not unusual for considerable sediment to have accumulated in the cistern bottom. Pump out water and semi solids and dig out solid material from the cistern.

Note. Is the cistern a well? If water seeps in after emptying the cistern, it is acting as a well and well-plugging procedures must be followed as specified previously. Follow procedures outlined in Extension Bulletin MF-935, *Plugging Abandoned Wells*.

Step 2. Clear debris. Remove all piping, hardware and nonmasonry or stone materials from inside and around the site.

Step 3. Puncturing the bottom. The cistern must not hold water, so the bottom must be removed, broken, drilled, or otherwise made to leak so any water that may seep from the surface into the cistern can get away and not accumulate inside.

Step 4. Plugging openings. Any pipes into the cistern must be removed or cut off at the inside surface. These holes and all other openings must be carefully cleaned and plugged with high quality cement to make a permanent plug. Disconnect and plug all underground inlet pipes at the source if it is not practical to remove the pipe. When finished the top and any top or side penetrations should not allow any water to enter the cistern. This may require a new cover or caulking the cover in place.

Step 5. Filling the cistern. Sand, gravel, or other clean, inert, granular material may be used. This material must be carefully placed in far corners before finally filling near the opening. The whole interior must be filled and compacted so it will not settle and leave voids. Considerable efforts will be required to fill all spaces in corners, and sand will require compacting to prevent settling.

Step 6. Replace the top cover. The inert fill material will prevent any safety hazard from possible collapse of the top. If the top should crack, deteriorate, or otherwise become leaky, repairs must be made to keep water out, or the permanent plugging previously described must be done.

Shallow Cistern Removal

Many cisterns are shallow (no more than a few feet deep), and may be partially above ground. The best course of action for disposal of these cisterns is complete removal. This is especially true if the side walls are brick or concrete block laid with mortar. Removal is a permanent solution that may not involve much more effort than the less-permanent solution of filling the structure in place. Once removed, the hole should be filled in shallow layers with local subsoil and thoroughly compacted. If the hole is less than 5 feet deep and the bottom does not contact fractured rock or coarse material, it is not necessary to place a grout plug.

Summary

Abandoned cisterns, cesspools, seepage pits, septic tanks or other holes are a potential safety hazard to people, animals and structures. They also are possible sources of direct contamination of valuable groundwater. To eliminate safety and environmental hazards and minimize liability exposure, they should always be properly plugged as a preventive action.

Other information sources include KDHE (785-296-5545) or local offices such as the Nonpoint Source program through the county conservation district office, local health or environmental office and county extension office.

List of References

- Selected K-State Research and Extension Publications
- Plugging Abandoned Wells* MF-935
- Safe Domestic Wells* MF-970
- KDHE Bulletin 4-2, *Minimum Standards for Design and Construction of Onsite Wastewater Systems*, K-State Research and Extension MF-2214
- Get to Know Your Septic System* MF-2179

Other Publications
Uniform Plumbing Code

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Kansas State University Agricultural Experiment Station and Cooperative Extension Service, Manhattan

MF-2246

July 1998

It is the policy of Kansas State University Agricultural Experiment Station and Cooperative Extension Service that all persons shall have equal opportunity and access to its educational programs, services, activities, and materials without regard to race, color, religion, national origin, sex, age or disability. Kansas State University is an equal opportunity organization. Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, Marc A. Johnson, Director. File Code: Engineering 4-5 (Water Quality)



Private Well Maintenance and Protection

Recent surveys of private wells have shown that on average only 40 percent meet safe drinking water standards used for public systems. Less than 20 percent of dug wells meet these standards. The primary reasons for this poor condition of water quality from private wells are the following factors:

- well down slope or near contamination sources
- well not constructed to present standards
- inadequate well maintenance and service
- well not protected from activities that risk contamination

Well Maintenance Needs

Maintenance is required to assure that private wells with good location and construction continue to be safe. A well that is not maintained can not be expected to reliably produce safe water. Conversely, wells that receive regular maintenance are more likely to produce safe water.

Annual well maintenance is recommended to include: check of the well casing for cracks or leaks, check of the well cap for water tightness, ground surface sloped away from the well for 15 feet in all directions, shock chlorination of the well and water system, and test of water for coliform bacteria, nitrate, pH and total dissolved solids. See Table 1 for a private well checklist of actions.

Every well needs a wellhead protection plan to assure protection of water quality especially wells being used for human consumption. The plan must then be implemented to have any benefit. The wellhead protection plan indicates site vulnerability to groundwater contamination and rates the risk of activities within 500 feet of the well. With so many problems of poor well water quality, it is in the owners' interest to take steps to protect their own wells so they can have safe water.

The first concern is that the location meets recommended separation distances between the well and sources of contamination as shown in Table 2. Well location with respect to potential contamination sources is the most important factor for protection of water quality. Without a plan to protect the well from contamination, some high risk activities will very likely occur near the well. In time, there is increased risk of groundwater contamination and well water quality deterioration, which may be permanent.

A good wellhead protection plan involves careful planning and may include a primary and secondary protection area as shown in Figure 1. In the primary protection area all high risk situations and activities are avoided and moderate risk activities are managed carefully. The radius for the primary protection area should be 100 feet minimum and up to 300 feet or more is preferred.

In the secondary protection area, high risk situations and activities employ additions or management to shift them to low or moderate risks. The radius for the secondary protection area should be a minimum of 200 feet and 400 feet or more is preferred. Guidelines for high, moderate, and low risk are shown in Table 3.

Table 1. Private Well 12-Point Check

Do at least once a year:

- Check to see that well casing is free of cracks or other leaks from water table to at least 1 foot above the ground surface or highest flood level.*
- Check that the sanitary seal is secure and watertight and is a KDHE-approved type.*
- Make sure the ground slopes away from the well for at least 15 feet in all directions.*
- Shock chlorinate the well and water system.*
- Test water and file the results with other records and information about the well.*

Always do:

- Have a licensed well driller or knowledgeable landowner do all work on well or well casing and be sure well meets all current construction standards*
- Find and fix the cause of any change in water color, taste, or odor. Shock chlorinate the well.
- Maintain 50 feet (100 preferred) of open space between the well and any buildings, waste system, parked vehicle, equipment, compost, or other contamination source.
- Store chemicals such as fertilizer, pesticides, oil, fuel or paint at least 100 feet down slope.
- Properly plug all abandoned wells and other holes not used in last 2 years and plug all unused cesspools and septic tanks*
- Prevent backflow and back-siphonage by maintaining an air gap above the container you are filling, or by using an adequate backflow prevention device.
- Shock chlorinate the well after any service work on the pump, well or water system*

* see Extension bulletins for additional information

The Farm•A•Syst or Farmstead Assessment System, K-State Research and Extension publication EP33-48, is designed to help the landowner to assess potential contamination sources and develop a wellhead protection plan.

Operation needs

Each year many wells are threatened or damaged by accidents that occur near the well. Examples include: fuel tank springs a leak, fertilizer nurse tank loses its contents, or parked sprayer is hit, and spills pesticide. These are all things that happen. The impact of these activities can be eliminated or minimized with diligent management decisions. By simply moving these activities far away from the well, the impact to the well is delayed and may even miss the well completely.

Anticipating possible accidents and taking precautions takes a small amount of time and expense compared to cost of cleanup or environmental damage. An ample supply of good quality water is an absolute necessary for living and operating the land. Permanent contamination of groundwater ultimately means loss of property value and may involve liability. Replacing the hose on the fuel tank when it is deteriorated and providing secondary containment are management actions that add protection inexpensively.

Liquids that would contaminate water should be managed carefully to avoid possible damaging accidents. Plan all storage locations including temporary ones away from at least the primary protection area and perhaps the secondary area also. State law requires

any spills or accidental releases to be reported to Kansas Department of Health and Environment, (KDHE) 785-296-1678.

Backflow of contamination into the water system or well can easily result from a loss in pressure due to pump failure, line break, or power interruption. These accidents can be hazardous or fatal to people and animals. The most common backflow hazard results from a hose placed into a tank or container. This hazard is most inexpensively and reliably eliminated by maintaining an air gap above the lip of the receptacle. Instead of putting the hose into the tank, use a holder to support it above the container lip. Backflow prevention devices (backflow preventers) should be installed to protect from backflow or back siphonage whenever maintaining an air gap is not possible.

Important Well Records

A well is an important long-term investment to a homesite or farmstead. All information regarding its construction, modification, maintenance and water testing should be kept in a safe, accessible place. The following paragraphs briefly describe the important records. Extension bulletin, *Private Water Well Owner/Operator Manual*, S-116 is a file folder designed to keep these records together.

Well Record. Since 1975, well drillers have been required to file a well log with KDHE. The well log gives important information about well construction including well depth, geologic layers penetrated, well casing, well

Table 2. Minimum Separation Distance from Private Wells

This table gives the minimum separation distance required by regulation, K.A.R. 28-30-8, and recommended distances from the well site to sources of contamination. Greater separation distances should be provided where possible.

Potential Source of Pollution	Separation Distances (in feet)	
	Minimum Required	Recommended
Sealed sewer line (cast iron, tight line, etc.)	10	50
Unsealed sewer lines	50	>400
Septic tanks (water tight)	50	>100
Wastewater absorption field (septic lateral lines)	50	>400
Pit privies	50	>400
Stables, livestock pens, lagoons and manure piles	50	>400
Streams, lakes and ponds	50	>100
Silage pits, fertilizer and fuel storage (above or below ground)	50	>400
Seepage pits (or rat holes) prohibited after May, 1996	50	>400
All other wastewater systems	50	>100
Property line	25	> 50
Public water supply sources (i.e., wells) ¹	100	>100
Building/structure (termite treatment) ²	50	>100
Pesticide storage, mixing and disposal areas or areas of repeated pesticide use	50	>400

* These distances do not necessarily assure that no contamination will reach the well.

¹ Required by Policies, General Consideration and Design Requirements for Public Water Supply Systems in Kansas [K.S.A. 65-162a(b)].

² Not required by K.A.R. 28-30-8(a) but is required when injecting liquid pesticides into the soil.

screen, grouting, water depth and well yield. A copy of the well log, construction cost and other information pertinent to the well should be kept together. The pump papers including cost, model and serial numbers, and warranty information also should be kept.

Well Service. Like other equipment, a well needs maintenance. A record of well service, repairs and improvements, together with details about what was done, who did the work, and the cost should be kept with well records. A convenient record keeping log is provided on the back of Private Water Well Owner/Operator Manual. This record of well service is a convenient way to chart a record of well maintenance and service.

Well Tests. Retain all water tests and compare results with previous and subsequent tests. Charting a graph makes it easy to observe when report values change significantly. Does the record show a trend that suggests a specific source of impact to water quality? Does the record fluctuate with the time of year, suggesting a seasonal effect? The more testing data available, the greater the confidence in the record. When water test results change a lot over a short or long time, a contributing source for the change may be nearby or the well may be in the path of a pollutant plume.

Figure 1. Well Site and Wellhead Protection Plan

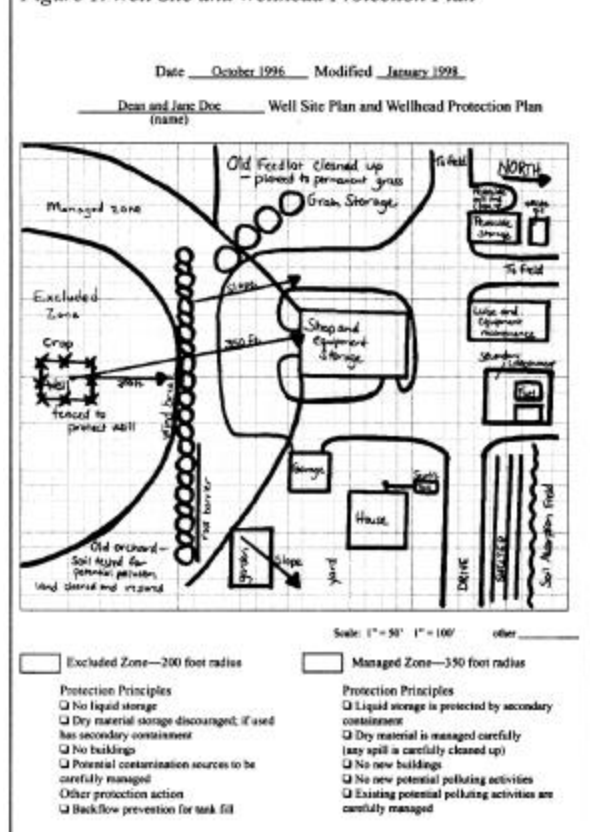


Table 3. Relative Risks for Home or Farmstead Activities.

Group A: High Risk

- Polluting liquids without secondary containment such as fuel, solvent, chemicals (fertilizer, pesticide, etc.)
- Liquid waste (sewage, manure, etc)
- Water-soluble materials like fertilizer, pesticides
- Livestock lots, abandoned livestock lots and other wastes
- Buildings and areas where the above materials are used, transferred, mixed, stored or cleaned up (such as: shop or sprayer fill/clean up area)
- No backflow prevention for the water system

Moderate Risk

- Intensive cropland especially irrigated land where chemicals (fertilizer or pesticide) are applied, gardens, home and yard
- Powered equipment storage (tractors, truck, auto, etc),
- Garage, grain storage, silo
- Livestock buildings with minimum liquids.
- Mechanical backflow prevention used for water systems.

Low Risk.

- Pasture rangeland, woodland, low intensity (low or no chemical) cropland,
- Nonpowered machine storage,
- Windbreak,
- Low use buildings,
- Organic garden, organic cropland,
- Liquid storage with full secondary containment and careful management
- Water soluble materials with full spill protection, cleanup and careful management
- Air gap maintained for all filling operations and backflow prevention is used throughout the water system

For More Information:

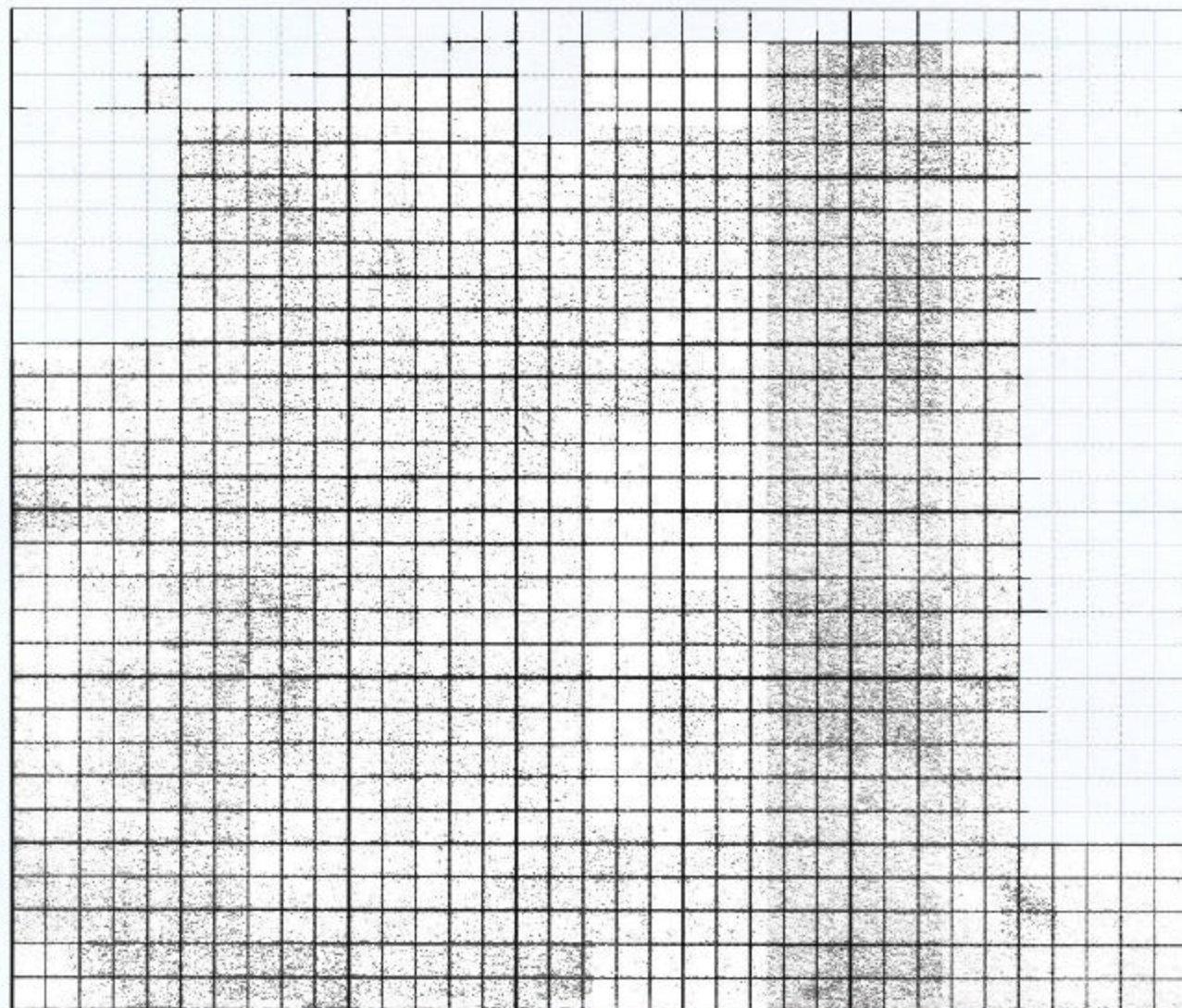
- Plugging Abandoned Wells. MF-935
- Plugging Cisterns, Cesspools, Septic Tanks and Other Holes. MF-2246
- Private Water Well Owner/Operator Manual
- Private Well Location and Construction, MF-970
- Shock Chlorination for Private Water Systems, MF-911
- Recommended Water Tests for Private Wells, MF-871
- Testing To Help Ensure Safe Drinking Water. MF-951

For Assistance :

- Local Health or Environmental office
- County or District Extension office
- K-State Research and Extension, Bio. & Ag. Engineering, 237 Seaton Hall, Manhattan, KS 66506 (785-532-5813)
- KDHE, Division of Environment, Nonpoint Source Section, Building 283, Forbes Field, Topeka, KS 66620 (785-296-4195)
- Kansas Geological Survey, 305 Moore, Lawrence, KS 66049 (785-864-3965)

Date _____ Modifications _____, _____, _____

(name) Well Site Plan and Wellhead Protection Plan



Scale: 1" = 50' 1" = 100' other _____

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Kansas State University Agricultural Experiment Station and Cooperative Extension Service

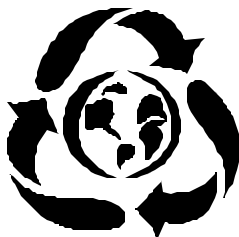
MF-2396

June 1999

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File code: Engineering 4-5

Recycling Program in Butler County



Recycling services are available in these towns each month on the days listed below. Contact the city office for times and locations.

Andover - 1st & 3rd Saturday
 Augusta - Saturdays
 Benton - 1st & 3rd Saturday
 Cassoday - 2nd Thursday
 Elbing - 1st Tuesday
 El Dorado - Tuesday - Saturday
 Landfill - Monday - Saturday

Latham - 2nd Tuesday
 Leon - 2nd & 4th Wednesday
 Potwin - 3rd Thursday
 Rosalia - 3rd Tuesday
 Rose Hill - 2nd & 4th Saturday
 Towanda - 2nd & 4th Saturday
 Whitewater - 1st & 3rd Wednesday

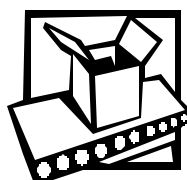
How do I get Started Recycling?

- You can use boxes, paper sacks or 5 gallon buckets to store your materials in until the trailer comes to your town. Or, you can buy containers made for recycling.
- You'll need a large container for newspaper and plastics, and smaller containers for glass, tin cans and pop cans.
- Sorting and cleanliness are very important! Rinse cans, plastic and glass containers. Rings and lids must be removed from all containers. It's okay to leave labels on metal cans, glass and plastic. Paper, magazines and cardboard should be clean and dry.
- Generally, if a plastic container has a recycle symbol of a 1 or 2 on the bottom of the container, it can be recycled at the trailer. All other plastics are not accepted.
- When the trailer visits your town, gather up your recyclable materials and put them in the appropriate bins on the trailer. Keep materials separated, and please, no trash!



Newspapers

- Clean and dry
- Paper inserts OK



Cardboard Boxes

- Corrugated Cardboard only



Plastic

- HDPE 2 - Opaque Milk Bottles
- HDPE 2 - Colored Detergent Bottles
- PETE 1 - Juice and Pop Bottles
- Remove lids & rinse
- No Mixed Plastic

Glass Containers

- Clear, Brown or Green
- Remove lids and rinse.



Tin Food Containers

- Rinse
- Labels okay



Magazines

- Clean and dry

Mixed Paper

- Junk mail, office paper



Aluminum

- Rinse

**** Please, do not recycle containers that have contained motor oil, antifreeze, vegetable oil, or toxic substances. ****

Sponsored by: Flint Hills RC&D, Butler County Public Works,
 City of El Dorado and Butler County Conservation District.
 For more information, call 316-320-5891 or 316-320-1453.



Public water supplies are tested regularly, thus users do not need to be concerned about the quality or safety of their drinking water. Conversely, people who have a private water supply are responsible for all quality and safety aspects of their water supply. If a well's location, construction, maintenance (including water tests), or protection are deficient, safe drinking water can not be reliable.

Ensuring Safe Drinking Water

Wells and groundwater are often contaminated because of poor location, inadequate construction, delayed or no well maintenance, accidents, and lack of protection. Recent surveys of private wells show about 80 percent are deficient in construction or location. The most common contaminants of health concern are coliform bacteria and nitrate followed by salts (often sodium chloride), petrochemicals, and pesticides. Safe water requires action by the owner or water user to ensure a safe well. Begin with an annual check of the well and water system, including these elements:

1. Check well location and safety of construction (see MF-970) and make necessary improvements.
2. Do annual preventive maintenance including thorough shock chlorination of the well and water system.
3. Test water, keep test reports for reference, and compare reports to detect changes or problems.
4. Develop and carefully follow a plan to protect well and groundwater from contamination (see MF-2396).

What Tests Are Necessary?

There is no single test for safe drinking water. Tests are for specific contaminants including coliform bacteria, nitrate, fluoride, lead, pesticides, etc. Surveys show about 60 percent of private wells are polluted by bacteria or nitrate, both of which have potentially serious health risks.

Test with a purpose(s) (see MF-871), including to assure safety, detect changes with time (contamination), or document good quality. Test for coliform bacteria, nitrate, total dissolved solids, and pH as part of annual well maintenance. Much more frequent bacteria tests are needed to assure safe, bacteria-free water, especially when a well has a deficiency. Always test for coliform bacteria after any maintenance or repair of the well or water system.

Before using a well for drinking or irrigation test the water's suitability for that purpose. Retest the suitability every 3 to 5 years. Consider testing for specific chemicals that have been stored, used, or spilled near the well.

Testing to Help Ensure Safe Drinking Water

Which Labs Are Qualified?

The only way to judge the quality of laboratory service is through independent evaluation. Kansas Department of Health and Environment (KDHE) does laboratory certification for Kansas. We recommend only laboratories certified for the tests you want or need. This leaflet lists laboratories certified for drinking water tests located in Kansas and nearby states. For detailed information about specific chemical certification, contact KDHE, Laboratory Improvement program office (785) 296-1639 or www.kdhe.state.ks.us/envlab/index.html. All states have a laboratory certification program similar to Kansas. Contacts for surrounding states are listed in the table on the back page.

Selecting the Laboratory

Because any laboratory certified for the test you want should be equally capable to do the test, price is not a good gauge of quality. Nitrate and bacteria tests from one laboratory may be \$20, yet others may charge \$50. The trade association, American Council of Independent Laboratories, at www.acil.org may help in choosing a laboratory. We recommend selecting a laboratory within overnight shipping by U.S. Postal Service or other carrier. The bacteria test must be started within 24 hours of sample collection for accurate results. Ask the lab for the days and times that they start water samples and plan accordingly.

Collecting and Transporting the Sample

Contact the laboratory to get a sample container. Follow instructions, either from the laboratory or K-State Research and Extension publication MF-963, to collect the sample. After collecting, refrigerate the sample, but do not freeze, and keep it out of the sunlight. Be sure the sample reaches the laboratory so the test can begin within 24 hours.

Related K-State Water Quality Titles:

- *An Action Program for Safe Drinking Water*, MF-1050
- *Kansas Home*A*Syst—Environmental Risk Management for Homes*
- *Organic Chemicals and Radionuclides in Drinking Water*, MF-1142
- *Private Water Well—Owner/Operator Manual*, MF-2409
- *Private Well Maintenance and Protection*, MF-2396
- *Private Wells—Safe Location and Construction*, MF-970
- *Recommended Water Tests for Private Systems*, MF-871
- *Shock Chlorination for Private Water Systems*, MF-911
- *Taking a Water Sample*, MF-963
- *Understanding Your Water Test Report*, MF-912

G. Morgan Powell, *Extension Engineer, Water Quality*
Judy M. Willingham, *Extension Assistant*

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

KDHE Certified Laboratories in Kansas and Neary States for Drinking Water Testing

Coliform Bacteria (B), Lead (L), Metals/Minerals (M), Nitrate (N), Organic (O), Radiochemistry (R), Trichloroethane (T), and Unregulated Organics (U)

Laboratory Name, Location Address and City	Mail Address and City	Telephone	B	L	M	N	O	R	T	U	Renew
Analytical Management Lab Inc, Olathe, KS 66062-2760	15130 S. Keeler, Suite B	(913)829-0101	-	L	M	-	O	-	T	U	4/2004
Continental Analytical Services Inc, Salina, KS 67401-6675	1804 Glendale Road (800-535-3076)	(785)827-1273	B	L	M	N	O	-	T	U	???
Dean's Water Lab Inc, 401 S. Alleghany, El Dorado, KS 67042	P O Box 610, Andover, 67002-9780	(316)733-2682	B	-	-	-	-	-	-	-	10/2004
Environmental Lab Inc, 821 N. Washington St. Auburn, KS	P O Box 120 Auburn, KS 66402-0120	(785)233-1860	B	-	-	N	-	-	-	-	4/2004
General Laboratories Inc, Hutchinson, KS 67501-4501	1202 North Main Street	(620)663-8314	B	-	-	-	-	-	-	-	10/2004
Hazen Research Inc, Golden, CO 80403-1895	4601 Indiana Street	(303)279-4501	-	-	-	-	-	R	-	-	10/2004
Keystone Laboratories Inc, Kansas City, KS 66103-1359	1304 Adams Street	(913)321-7856	B	-	-	N	-	-	-	-	4/2004
M D Chemical & Testing Inc, Topeka, KS 66619-0321	Forbes Field, Bldg 281, Suite AB, PO 19321	(785)862-3500	-	L	M	N	-	-	-	-	4/2004
Midwest Laboratories, Inc. * Omaha, NE 68144	13611 "B" Street	(402)334-7770	B	L	M	N	-	-	-	-	12/2003
Olsen Agricultural Laboratory Inc. * McCook, NE 69001-0370	210 East First Street / P O Box 370	(308)345-3670	B	L	M	N	-	-	-	-	12/2003
Pace Analytical Services Inc, Lenexa, KS 66219-2406	9608 Loiret Boulevard	(913)599-5665	B	-	M	N	O	-	T	U	4/2004
Pace Analytical Services, Inc, Broken Arrow, OK 74012	1700 West Albany Street	(918)251-2858	-	-	-	-	O	R	T	U	10/2004
Paragon Analytics Inc, Fort Collins, CO 80524	225 Commerce Drive	(970)490-1511	-	-	M	N	O	R	-	U	7/2004
SDK Laboratories Inc, 1000 Corey Road (877-464-0623)	P O Box 886, Hutchinson, KS 67504-0886	(620)665-5661	B	-	-	N	-	-	-	-	10/2004
Servi-Tech Laboratories Inc, 1816 East Wyatt Earp Blvd.	P O Box 1397, Dodge City, KS 67801-1397	(620)227-7123	B	-	M	N	-	-	-	-	10/2004
	(800)557-7509										
Servi-Tech Laboratories Inc. * 1602 Park West Drive	P O Box 169, Hastings, NE 68902-0169	(402)463-3522	-	L	M	N	-	-	-	-	12/2003
		(800)468-5411									
STL - Denver, Arvada, CO 80002-4517	4955 Yarrow Street	(303)726-0100	-	L	M	N	O	-	T	U	4/2004
STL - St. Louis, 13715 Rider Trail North	Earth City, MO 63045-1205	(314)298-8566	-	-	-	-	-	R	-	-	10/2004

*Certified through State of Nebraska, Nebraska Health and Human Services System

Laboratory Certification Program: National EPA Web site: www.epa.gov/safewater/faq/scs.html, Adjacent states: Colorado (303)692-3291 Web site: www.cdphc.state.co.us/certification/schwtsd.pdf, Missouri (573) 526-3832 Web site: www.dnr.state.mo.us/wpscd/pdwp/rlabs/clabs.htm, Nebraska (402) 471-8426, and Oklahoma (405)702-1024 Web site: www.deq.state.ok.us/csdnew/labcert.htm

MF-951 (Revised)

It is the policy of Kansas State University Agricultural Experiment Station and Cooperative Extension Service that all persons shall have equal opportunity and access to its educational programs, services, activities, and materials without regard to race, color, religion, national origin, sex, age or disability. Kansas State University is an equal opportunity organization. Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, George E. Ham, Interim Director.

WATER

QUALITY SERIES

Wastewater Pond Operation, Maintenance, and Repair

Wastewater ponds, or lagoons, are common for treating and disposing wastewater from individual homes. The homeowner, occupant, or service provider is responsible for day-to-day operation, maintenance, and repairs of wastewater ponds. This bulletin is a guide for doing these tasks.

Operation

Operating a pond includes tasks done at least monthly and more frequently some times of the year. The operator should make a monthly operation assessment of the following items.

Control vegetation. Vegetation on pond embankments should be healthy, vigorous, perennial grass. Inside the fence and embankment, grass should not be taller than 6 inches. Tall vegetation drapes into the water and restricts airflow. Evaluate and adjust the mowing schedule to meet the 6-inch-maximum goal. Outside the embankment, the perennial grass should be healthy and vigorous for protection, but a limitation on height is not so important.

Observe and record water color. The water's color is directly related to pH and dissolved oxygen and is a good indication of the pond's health. Table 1 lists water colors and corresponding interpretations. A change to a less-desirable color has a cause and may require correction. Record water color on a chart with water depth.

Observe and record water level. The pond should be equipped with a post having markings to check water depth. Record depth at the same time each month in order to monitor changes. This provides information for normal operation of the pond, for changes and trends, and provides a record in case of a problem. Records should be maintained for at least 5 years showing water levels and the dates measured.

Adjust supplemental water. Wastewater ponds sometimes need added water to maintain the minimum 3-foot depth. The method for adding water must be controllable. During periods of high rainfall or when approaching the 5-foot maximum depth, supplemental water is shut off or diverted. The best pond depth is 3 to 5 feet. A 2-foot distance, or freeboard, above the 5-foot depth to the top of the berm is essential to contain a large rain.

Check for problems and needed repair. Warning signs include odor, profuse algae bloom, and high water levels. These problems may be caused by excess sludge accumulation, but there are other causes. The monthly operation assessment must include watching for needed repairs.

Maintenance

Maintenance includes items done on a routine schedule: annually, seasonally, monthly, or another schedule.

Caution: always be careful to minimize exposure to wastewater by wearing protective clothing and water-proof gloves. After working with wastewater, thoroughly wash hands or shower and disinfect any breaks in skin.

Mow vegetation. The top and waterside of the embankment should be mowed to keep grass shorter than 6 inches. Cut to 3 inches often enough so no more than half of the growth is removed at each mowing. Mow cool-season grasses like fescue every 2 weeks in cool months and monthly when it is hot. Mow so clippings discharge away from the water. Total removal of clippings is a good option.

Outside the embankment, mowing should be planned to stimulate a dense, healthy grass cover. Mow cool-season grasses in early May and mid-June. Mow warm-season types (native species) in early July and mid-August.

Burn all areas as needed to control accumulation of residue, usually every 3 or 4 years for warm-season grasses and 5 or 6 years for cool-season grasses. Burn when new growth is just beginning. Always follow safety precautions.

Control rooted plants in water. The pond should be free of rooted vegetation to help avoid mosquitos, aquatic animals, and sludge accumulation. A minimum water depth of 3 feet helps prevent rooted plants from growing.

Rooted plants along the edges may be controlled in two ways. First, dig them up or pull them out. This works best when plants first get started. After plants become established, this is a formidable task.

Table 1. Color as an Indicator of Pond Condition

COLOR	CONDITIONS	SYMPTOM OR CAUSE
Dark sparkling green	Good	pH and dissolved oxygen (DO) ideal.
Dull green to yellow	Not so good	DO and pH are dropping. Blue-green algae type becoming predominant.
Gray to black	Very bad	Pond is septic. Anaerobic conditions prevail.
Tan to brown	OK if brown algae (not found in Kansas)	Not good in Kansas, means erosion or inflow of surface water.

Second, use herbicides labeled for target plants that protect algae. Apply with "wick" directly to plants. Broadcast spraying risks getting chemicals in the water, requires more product, and should be used only after careful evaluation.

Control floating plants. Sunlight must penetrate the water to reach dispersed, single-cell algae. Algae produce oxygen essential for bacteria to make ponds function well. Anytime floating plants like water lilies, duck weed, or "moss" intercept light, dispersed algae don't thrive, and the pond can begin to smell due to lack of oxygen.

Floating plants can be physically removed or controlled with herbicides. Always act when plants first appear. Select a herbicide for the specific plants to be controlled that does not harm single-cell algae or the environment. Control with herbicides adds organic load, which may cause odor.

Check fence and gate. Check the fence and gate at least yearly to be sure it is in good repair. There should not be any holes or gaps greater than 2 inches at the bottom of the fence or around the gate. Look for sags, damage, or holes larger than 8 square inches. The fence must keep children and animals out of the pond area.

Check sludge. For best pond performance, maintain at least 18 inches of water above the sludge. Measure the sludge accumulation at the same point at least yearly, preferably near the center of the pond. A stick with a towel wrapped tightly around it is lowered into the water, and the water level marked. After a few minutes, pull the stick out slowly. Solids clinging to the towel show the sludge level. Measure the distance from the surface mark to the sludge solids, record the result, and compare with previous levels.

Remove trees and woody plants. Trim or remove trees shading the pond's east, south, and west sides. Sunlight must reach the pond surface throughout the year, and wind must move freely across the surface. Photosynthesis by algae and air exchange at the water surface are the only ways oxygen enters water. Remove all trees within 30 feet and shrubs within 15 feet of the embankment to keep roots out of the berm. Keep tree leaves out of the pond because they add biomass and sludge.

Repairs

Repairs are unscheduled work that must be done soon to prevent damage, malfunction, or possible failure of the pond.

Repair fence and gate. The fence should not be more than 2 inches from the ground with barbed wire at the bottom. If large animals are around, two strands of barbed wire should top the fence to discourage them from reaching over it. Holes in the fence or gate must be repaired so animals and children cannot get through. Make sure the gate fits well, closes the opening when shut, and opens easily. Check that hinges are secure and locking prevents unauthorized entry.

Repair leaks or seeps. The embankment may leak because of construction or damage from vegetation or animals. Any leakage must be corrected through repair of the embankment and sealing the inside surface of the pond. KDHE guidelines specify ponds should leak no more than 1/4 inch per day. Leakage can be controlled by compaction, bentonite clay, or correct soil amendment additives.

Fill erosion and reseed. The embankment must be maintained at the original top-height elevation and surface shape. Any time there is erosion or damage to the embankment, the affected area must be filled, compacted, leveled, and reseeded to a perennial grass. Mulching helps control erosion until vegetation is established. Repeated seeding may be required, unless the area is watered, to ensure a good grass cover.

Emergency dewatering. Under normal operation and weather conditions, a pond's water depth should not exceed 5 feet. Sometimes short-term conditions, such as extra water use or a long wet spell, may result in excess water. When a pond has too much water, pumping the excess to an on-site, grassed area without runoff may be an option, but it must be approved by the local health department. People and animals should be kept out of the area where wastewater is applied until the ground is dry (at least 72 hours).

If dewatering is required more than once in several years, the cause needs to be evaluated. If wastewater production has increased, a pond may need to be enlarged, reconstructed, or a second cell added.

Ponds must not have discharge lines or indiscriminate overflow. A NPDES permit from KDHE is required for discharging ponds.

Remove sludge. There is disagreement about the best method to handle sludge accumulation. If there is access to livestock-waste-handling equipment, pumping a few loads of sludge off the bottom every few years may be a good option. This controls sludge accumulation and delays rebuilding or completely cleaning the pond. Having a septage hauler do the same is possible but expensive. Requirements for proper sludge disposal are found in the EPA's 40 CFR Part 503, covering allowable techniques and required record keeping. Check requirements of the county permitting agency.

When a pond is full of sludge, cleanout is expensive. If space is available, it is considerably cheaper and easier to rebuild than to clean a pond and haul the sludge away.

Other Sources of Information

Details for those who design and construct ponds are in the companion bulletin *Wastewater Pond Design and Construction*, MF-1044. Several Extension bulletins are available for details about grass management, aquatic weed control, fences, and other onsite wastewater components. Check with the local Extension or health office.

G. Morgan Powell

Extension Natural Resources Engineer

Barbara Dallemund

Extension Assistant Specialist, Onsite Wastewater

Ann Mayo

Lyon County Sanitarian

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

MF-2290

October 1997

Issued in furtherance of Cooperative Extension Work, acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, Richard D. Wootton, Associate Director. All educational programs and materials available without discrimination on the basis of race, color, national origin, sex, age, or disability.

File Code: Engineering 4-5 (Water Quality)

MS 10-97-5M

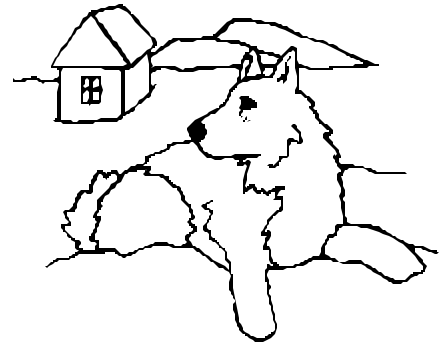
CHAPTER 6

REFERENCES

Access Kansas- Official State of Kansas Website - www.accesskansas.org.

Aerial Photos, Maps - See USDA Farm Services Agency or visit the Data Access and Support Center Website - <http://gisdasc.kgs.ukans.edu>.

Animal Control - For complaints regarding stray, nuisance and vicious dogs, contact the Animal Control Officer at 316-322-4325. For calls pertaining to livestock, exotic animals and animal cruelty, contact the Butler County Sheriff at 316-322-4254. Animal bites are handled by the Butler County Health Department, 316-321-3400.



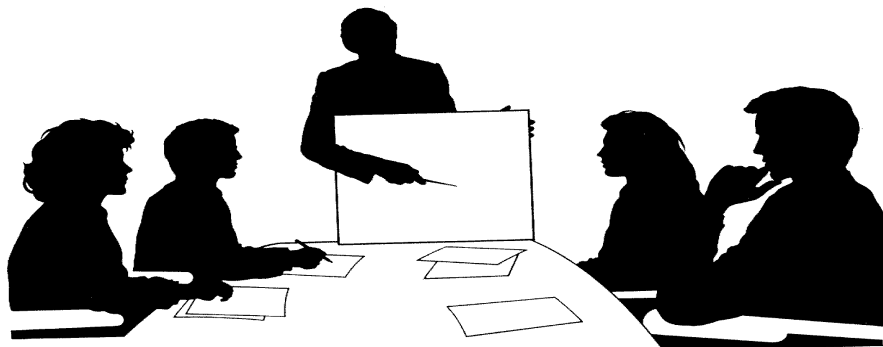
Building Permits - See Butler County Planning, Development and Environmental Services.

Butler County Website - www.bucoks.com

Butler County Board of Commissioners

Butler County Courthouse
205 West Central
El Dorado KS 67042
316-322-4300

County Commissioners meet on Mondays and Tuesdays of each week at the Butler County Courthouse. Meetings are open to the public. Concerned citizens are encouraged to speak at these meetings and time is allotted for public comment.



Butler County Conservation District

2503 Enterprise, Suite B

El Dorado KS 67042

316-320-5891

www.ink.org/public/ksccwww.cjnetworks.com/~sccdistrict/

Conservation districts are grassroots organizations that provide local leadership and direction on conservation issues and concerns. Conservation Districts encourage voluntary cooperation in protecting our natural resources.

The Non-Point Source Pollution Control and Water Resources Cost Share Programs are managed through the Butler County Conservation District. Cost share is available to eligible applicants for plugging abandoned water wells, water well improvement, repairing failing septic systems, establishing waterways, terraces, pasture, range and hayland plantings, filter strips, tree planting, spring developments, riparian and wetland protection and installing livestock waste storage structures. Educational materials and information are available through the Conservation District. District staff can also come and speak to your group or organization.

Butler County Department of Emergency Management and Homeland Security

911 Andover Road

Andover KS 67002

1-800-314-3503 or 316-733-9796

For Emergencies, Dial 911

www.bcem1.com

This office is in charge of planning, preparing and coordinating emergency teams for natural and man-made disasters that could occur in Butler County. Disasters include tornadoes, floods and hazardous materials spills or releases. Butler County Emergency Management is responsible for the reporting of spills to the State of Kansas, the primary contact for securing the services of the Butler County Hazardous Materials Team and the venue for collection of fees associated with the cost of clean ups. Emergency Management is the administrative arm of the Local Emergency Planning Committee (LEPC). LEPC is responsible for tracking and reporting hazardous materials in Butler County.

Butler County Health Department

206 North Griffith
El Dorado KS 67042
316-321-3400
1-800-940-6083



The Health Department performs such things as child vaccinations and addressing health related issues. They are responsible for calls pertaining to animal bites. They also check out complaints from residents on various health or environmental related matters.

Butler County Planning, Development and Environmental Services

Butler County Courthouse, Third Floor
205 West Central
El Dorado KS 67042
316-322-4325 or 1-800-940-6017

Permits are required for any construction activity such as building a house, putting up a barn, building or other structure, repairing or installing a septic system or lagoon, and requesting zoning changes. Complaints on zoning violations and other development or environmental issues should be directed to this agency. They also are responsible for calls pertaining to stray, nuisance and vicious dogs.



If you are buying or selling a house, you will need to contact the Planning and Development department for an inspection of your septic system and water well, if you have them, to assure they meet county regulations. They are also responsible for inspections of septic systems and water wells. Flood plain maps are available for review at this office.

Butler County Public Works Department

Butler County Courthouse, First Floor
205 West Central
El Dorado KS 67042
316-322-4101 or 316-320-1453 (Solid Waste Coordinator) or 316-321-5014 (Landfill)
1-800-822-7091

The Public Works Department operates the landfill and maintains county roads. Household Hazardous Waste and Recycling Services are located at the landfill southwest of El Dorado at the corner of SW 40th Street and Boyer Road.

Butler County Sheriff

114 West Central
El Dorado KS 67042
For emergencies, dial 911
316-322-4254
1-800-794-0190



The Butler County Sheriff's Department serves the citizens of Butler County by maintaining law and order, implementing and monitoring traffic control and providing warning support in the event of evacuation or severe weather. The Sheriff's Office is responsible for calls pertaining to livestock, exotic animals and animal cruelty.

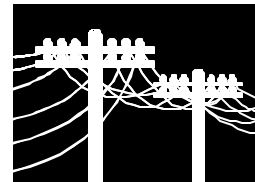
Butler County Weed Department

475 SE Poor Farm Road
El Dorado KS 67042
316-321-5190

The Weed Department administers and enforces the Kansas Noxious Weed Law in Butler County. The Kansas Noxious Weed Law requires all persons who own or supervise land in Kansas to control and eradicate all weeds declared noxious by legislative action. The Weed Department can help you identify noxious weeds and provide you with information on chemicals commonly used to kill a particular noxious weed. You can also purchase chemicals and rent sprayers from them.

Butler Rural Electric Coop Association, Inc.

316-321-9600
1-800-464-0060



Cable Television, Satellite TV - Look in the yellow pages under "Television" or "Cable Television".

City Offices:

www.bucoks.com

Andover - 316-733-1303
Augusta - 316-775-4510
Benton - 316-778-1625
Cassoday - 620-735-4252
Douglass - 316-747-2109
Elbing - 316-799-2196
El Dorado - 316-321-9100



City Offices (Continued):

Latham – 620-965-3121

Leon – 316-742-3438

Potwin – 620-752-3422

Rose Hill – 316-776-2712

Towanda – 316-536-2243

Whitewater – 316-799-2445

Composting, Yard Waste – Beginning January 2002, the landfill will no longer allow yard waste to be dumped in the landfill with the regular trash. This includes grass clippings, tree limbs, brush, leaves, etc. You can still take yard waste to the landfill; however, you will be directed to dump it at the compost site rather than in the landfill. Some cities in Butler County provide yard waste collection sites. Contact your nearest city office for more information. You can also start composting yard wastes at home. See K-State Research and Extension office for more information on home composting.

El Dorado Water Treatment Plant

380 East Central

El Dorado KS 67042

316-321-9100

The City of El Dorado treats water from El Dorado Lake and provides water to rural residents throughout Butler County through the Rural Water Districts. El Dorado Lake supplies the majority of Butler County residents with drinking water.

Electricity/Power

Look in the yellow pages under Electric Light and Power Companies

Environmental Protection Agency

Region 7

726 Minnesota Avenue

Kansas City KS 66101

1-800-223-0425

www.epa.gov



Responsible for implementing the federal laws designed to protect the environment.

Emergency 911 - Direct Emergency Hotline

911 is an emergency telephone number that provides immediate and direct contact to Fire, Police and Emergency Medical Services.

When to use 911:

Dial 911 to report a crime, a fire, a heart attack, a serious injury, a serious release of chemicals or any situation that requires immediate response by the Fire Department, Police/Sheriff Officers or an Ambulance.

Fire Districts/Departments

www.bucoks.com

Andover Fire and Rescue - Andover

For emergencies, dial 911
316-733-1863

Butler County Fire District # 2 - Augusta

For emergencies, dial 911
316-775-4500

Butler County Fire District # 3 - Rose Hill

For emergencies, dial 911
316-776-0401

Butler County Fire District # 4 - Cassoday

For emergencies, dial 911
620-735-4464

Butler County Fire District # 5 - Rosalia

For emergencies, dial 911
620-476-2290

Butler County Fire District # 6 - Latham

For emergencies, dial 911
620-965-2251

Butler County Fire District # 7 - Benton

For emergencies, dial 911
316-778-1155

Butler County Fire District # 8 - Douglass

For emergencies, dial 911
316-747-3097



Fire Districts/Departments (Continued)

Butler County Fire District # 9 - Leon

For emergencies, dial 911

316-745-3658

Butler County Fire District # 10 - Burns

For emergencies, dial 911

620-726-5203, 316-320-3171, 316-321-0129

El Dorado Fire Department

For emergencies, dial 911

316-321-9100

Atlanta (Cowley County Fire District #2)

For emergencies, dial 911

620-394-2290

Towanda Fire Department

For emergencies, dial 911

316-536-2751

Potwin Fire Department

For emergencies, dial 911

620-752-3422

Whitewater River Consolidated Fire Department

For emergencies, dial 911

316-799-2445

Fires, Open Burning, Range Burning, Etc. - Contact your local fire department for restrictions or to get a permit.

Flint Hills Resource Conservation and Development

311 Cottonwood Avenue

P.O. Box 260

Strong City KS 66869-0260

620-273-6321



The Flint Hills RC&D assists people in improving their quality of life through natural resource protection and enhancement, community development, tourism and recreation and information and education.



Flood Plain Maps - See Butler County Planning, Development and Environmental Services, or the USDA Natural Resources Conservation Service.

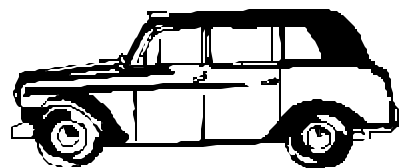
Gas Companies - Look in the yellow pages under "Gas Companies".

Home A Syst Program - This program identifies pollution risks and health hazards around your home and around your property. Through this program, homeowners can learn more about home and property management and where to find additional information. Homeowners have the opportunity to develop a plan to safeguard the health and well-being of the family, enhance the financial value of the home and protect the environment from contamination.

Home A Syst
237 Seaton Hall
Kansas State University
Manhattan KS 66506
785-532-5418
www.sbeap.org

Household Hazardous Waste Program - Take unwanted or unused paint, paint thinners, automotive oil, antifreeze, batteries, household or garden chemicals, etc. to the household hazardous waste collection site at the Butler County Landfill the first Saturday of each month from 8:30 AM to 12:30 PM. For more information, or for an appointment for other than the scheduled time, contact the Butler County Solid Waste Coordinator at 316-320-1453.

Junk Vehicles or Trash in Yards - See Butler County Planning, Development and Environmental Services.



K-State Research and Extension

206 North Griffith
El Dorado KS 67042
316-321-9660
1-800-894-1131
www.ksu.edu
www.oznet.ksu.edu/



Local extension agents can answer questions you have on horticulture, landscaping, soils, agriculture, livestock, pasture and range management, family and consumer sciences, 4-H, etc. Soil tests are handled through this office.

Kansas Corporation Commission

Conservation Division

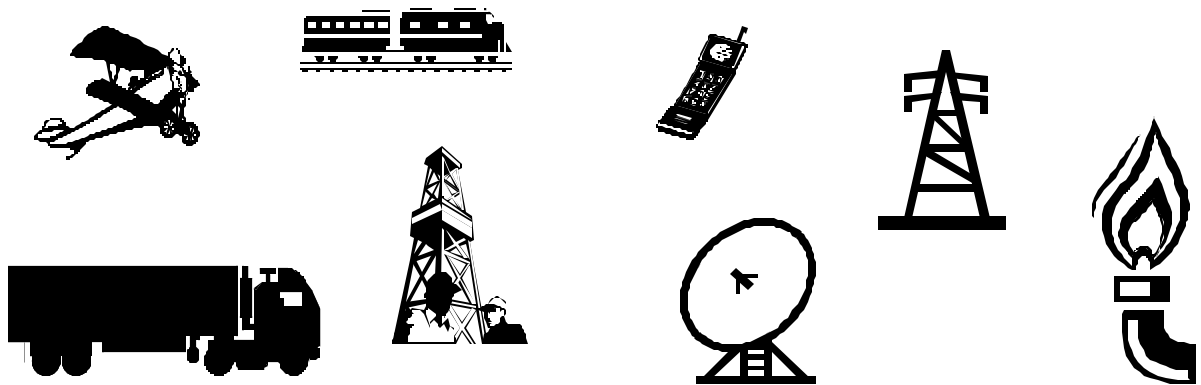
230 East William

Wichita KS 67214

316-337-6200

www.kcc.state.ks.us

The KCC regulates the state's telecommunications, electric and gas utilities, transportation and oil and gas production to protect fresh and usable water and soil and prevent the waste of oil and gas resources. The KCC will investigate abandoned oil and gas wells and will identify the person or company responsible for plugging the well.



Kansas Department of Agriculture

Division of Water Resources

901 S Kansas Avenue, Suite 200

Topeka KS 66612

785-296-3717

www.accesskansas.org/kda/dwr/index.html

A water regulatory agency, dealing with water quantity issues. Persons in Kansas wishing to modify a stream channel cross section (put in a dam, straighten channel, remove gravel, etc.) must obtain a permit from the Kansas Department of Agriculture, Division of Water Resources. Contact DWR for assistance with water rights or stream modifications.

Kansas Department of Agriculture

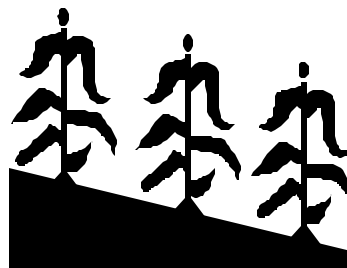
Plant Health Division

901 S Kansas Avenue, 7th Floor

Topeka KS 66612

785-296-2263

www.accesskansas.org/kda/



The KDA regulates pesticide labeling and use within Kansas. They also work closely with the US-EPA on programs to protect endangered species, groundwater and surface waters from pesticides. They investigate cases of misuse, improper storage and improper disposal of pesticides and containers as well as oversee noxious weed control, biological control and pest survey programs.

Kansas Department of Health and Environment

South Central District Office

130 South Market, 6th Floor

Wichita KS 67202

316-337-6020



The KDHE district office conducts field inspections of permitted livestock facilities and conducts site appraisals at livestock facilities that apply for a KDHE permit. The district office coordinates a wide number of state programs with county and city agencies. Complaints of environmental pollution can be reported through the district office.

Kansas Department of Health and Environment

Bureau of Water, Watershed Management Section

1000 SW Jackson Street, Suite 420,

Topeka, KS 66612-1367

Phone: 785-296-5567

www.kdhe.state.ks.us/water/nps.html



**Watershed
Management
Section**

Responsible for assuring a safe drinking water supply. Oversees monitoring and control of the discharge of pollutants into both surface and groundwater. Provides funding locally through grants for protecting water supplies, water quality information and education activities and riparian and wetland protection. Regulates water well plugging and drilling.

Kansas Department of Transportation

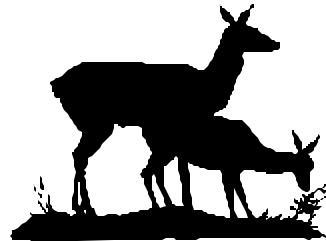
El Dorado Office
205 Oil Hill Road
El Dorado KS 67042
316-321-3370
www.ksdot.org

Coordinates the planning, development and operation of the various modes and systems of transportation in the state including roads (both state and locally owned), aviation, railroads and public transit.



Kansas Department of Wildlife and Parks

618 NE Bluestem Road
El Dorado KS 67042
316-321-7180
Fisheries Biologist 316-322-7513
www.kdwp.state.ks.us



Kansas Department of Wildlife and Parks is in charge of the day to day activities at El Dorado Lake State Park. They also enforce hunting and fishing regulations throughout Butler County. Fish kills in the County can be reported to the local office.

Kansas Geological Survey

1930 Constant Avenue
University of Kansas, West Campus
Lawrence KS 66047
785-842-9909
www.kgs.ukans.edu

Studies the State's resources and prepares publications on its findings. Publishes information on Kansas geology in books and maps.

Kansas Gas Service - 1-800-794-6101

Kansas Water Office

109 SW 9th Street

Topeka KS 66612

785-296-3185

1-888-526-9283

www.kwo.org

The Kansas Water Office is the water planning, policy and coordination agency of the State of Kansas. It prepares a state plan of water resources development, management and conservation, reviews all water laws and makes recommendations to the Governor and Legislature for new or amendatory regulation.

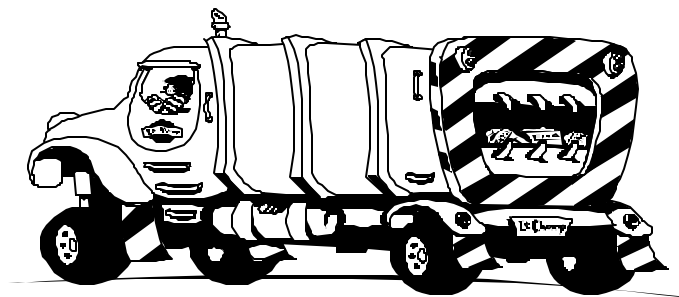
Landfill296 SW 40th Street (SW 40th and Boyer Road)

El Dorado KS 67042

316-321-5014

Solid Waste Coordinator 316-320-1453

The landfill is located southwest of El Dorado and is a division of the Butler County Public Works Department. Other services at the landfill include recycling, composting and household hazardous waste collection.



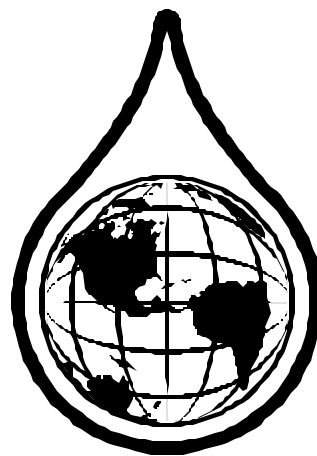
Local Environmental Protection Program (LEPP)

Butler County Planning, Development and Environmental Services
Butler County Courthouse, Third Floor
205 West Central
El Dorado KS 67042
316-322-4325 or 1-800-940-6017

The Local Environmental Protection Program is established through the Kansas State Water Plan. Financial assistance is provided to local governmental units to develop and implement a Local Environmental Protection Plan (LEPP). The LEPP includes sanitary code, subdivision water and wastewater plan, solid waste management plan, public water supply protection plan and a non-point source pollution control plan.

Nonpoint Source Pollution Program

Butler County Conservation District
2503 Enterprise, Suite B
El Dorado KS 67042
316-320-5891



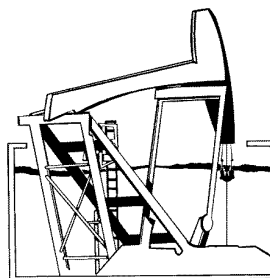
Non-point source pollution occurs when rainfall, snowmelt or irrigation runs over land or through the ground, picks up pollutants, and deposits them into rivers, lakes and coastal waters, or introduces them into ground water. Examples of non-point source pollution include the pollutants carried by eroded soil particles, nutrients and pathogens from agriculture, forestry, construction activity, runoff from urban areas, human and animal wastes, pesticide application and fertilizer application.

The goal of the non-point source program is to restore and/or protect groundwater and surface water sources in Butler County. Current activities of this program include educating the public on non-point source pollution and its impact on the environment, collection of water samples from streams above El Dorado Lake (the major water supply for Butler County) and providing cost share incentives for plugging abandoned water wells, repairing failing on-site waste systems, upgrading livestock waste systems and restoring riparian and wetland areas.

Oil Field and Related Problems

The Kansas Corporation Commission (KCC) is the regulating agency for the Oil and Gas industry in Kansas. Oil field spills of oil and salt should be reported to the District Office in Wichita at 316-337-6231. Abandoned oil wells and non-used pits on non-active and active leases should be reported to the Kansas Corporation Commission. A field investigation will be made of any complaint filed with the KCC and results of the investigation will be given to the person filing the complaint, if requested. Questions that a landowner has regarding oil field operations can be directed to the District Office.

Kansas Corporation Commission
District II
130 South Market, Room 2125
Wichita KS 67202
316-337-6231
www.kcc.state.ks.us



Open Burning, Range Burning, Controlled Fires, Etc. - Contact your local fire department for restrictions or to get a permit.

Poison Control Center - 1-800-332-6633.

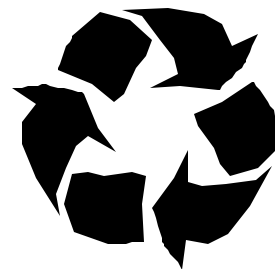


Ponds - Look under "Excavating Contractors" in the Yellow Pages.

The Natural Resources Conservation Service can provide you with technical assistance concerning ponds and pond construction. Contact 316-321-5803.

Propane Gas - Look under "Propane Gas" in the Yellow Pages.

Recycling - Recycling is available at the landfill (see Landfill), and in most towns in Butler County. Call the nearest town for information on recycling services available locally. For additional information, call 316-320-5891 or 316-320-1453.



Rural Development

2503 Enterprise, Suite C
El Dorado KS 67042
316-321-5818
www.rurdev.usda.gov

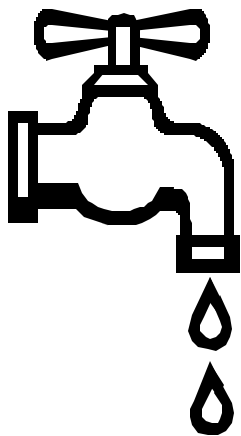


Provides medium and low income households the ability to purchase, construct, repair or relocate a home. Grants and loans are also available to very low income households to remove safety hazards from their homes or to make homes accessible for people with disabilities.

Rural Water Districts (Current as of 2003)

www.bucoks.com

Rural water districts provide water to rural residents. Most of the water provided through the Rural Water Districts comes from El Dorado Lake and is treated at the City of El Dorado Water Department. Rural water districts purchase the water from the City of El Dorado and then sell it back to rural residents.



Number 1 (El Dorado Area) - 316-320-1301
Number 2 (Augusta Area) - 316-320-1301
Number 3 (Rosalia Area) - 620-476-2439
Number 4 (Towanda Area) - 316-775-2813
Number 5 (Benton Area) - 316-778-1631
Number 6 (Leon Area) - 316-320-1301
Number 7 (Whitewater Area) - 316-799-2775
Number 8 (Rose Hill Area) - 316-789-8973
Sedgwick County - Number 3 - Contact Sedgwick County
Harvey County - Number 1 - Contact Harvey County

School Districts

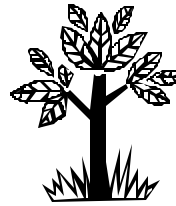
USD 205 - Bluestem/Leon/Haverhill - 316-742-3261
USD 206 - Remington/Whitewater/Potwin - 316-799-2115
USD 375 - Circle/Benton/Towanda - 316-541-2577
USD 385 - Andover - 316-733-5017
USD 394 - Rose Hill - 316-776-3300
USD 396 - Douglass - 316-746-2183
USD 398 - Peabody/Burns - 620-983-2198
USD 402 - Augusta - 316-775-5484
USD 462 - Central of Burden - 620-438-2218
USD 490 - El Dorado - 316-321-2780
USD 492 - Flint Hills/Rosalia/Cassoday - 620-476-2215



Soil Testing - For an analysis of the soil on your property to determine nutrient needs, see "K-State Research and Extension Office".

South Central Kansas District Forester

Natural Resources Conservation Service
9 West 28th St, Suite B
Hutchinson KS 67502
620-663-3501



Assists with the development of windbreaks, woodland plantings, wildlife habitat developments or other forestry related topics.

Stream Restoration/Riparian Technical Assistance

Technical and financial assistance is available for protecting and restoring eroding stream (riparian) banks and habitat. Assistance is available for site assessment, design and implementation of riparian area management projects. Technical assistance is available for rural and urban areas and includes soil bioengineering techniques (use of vegetation to protect water resources).

For more information on stream bank or riparian area restoration, contact the Butler County Conservation District at 316-320-5891, or the Kansas Department of Health and Environment at 785-296-5567.

Telephone



Look in the yellow pages under "Telephone Companies".

Townships Boards (2003 Officials)

www.bucoks.com

Township Boards are responsible for road maintenance and repair, mowing and spraying weeds in the ditches and repairing/replacing signs. (All area codes 316 unless noted.)

Augusta Township: Walter Burress, 775-2139

Benton Township: Dale Shaffer, 778-1769

Bloomington Township: Lynn Christian, 775-5966

Bruno Township: Bill Osborne, 733-1905

Chelsea Township: David Stackley, 321-4615

Clay Township: Joe Hall, 620-394-2473

Townships Boards (continued)

Clifford Township: David Nellans, 620-726-5566
Douglass Township: R. Marvin O'Neil, 747-2233
El Dorado Township: Dana McCoy, 320-1482 Shop 321-4710
Fairmount Township: Carney Hinz, 620-752-3740
Fairview Township: Curt Wood, 620-752-3153
Glenco Township: Gary Doornbos, 745-3522
Hickory Township: Ronald Peters, 620-965-2321
Lincoln Township: James R. Smith, 321-2384
Little Walnut Township: Gary Sphar, 742-3454
Logan Township: Debra Graham, 620-394-2261
Milton Township: Don Harder, 799-2216
Murdock Township: Alvin Claassen, 799-2300
Pleasant Township: Charles Griffitts, 776-2223
Plumb Grove: Keith Sommers, 620-752-3593
Prospect Township: Albert Noble, 620-476-2459
Richland Township: Loren McCune, 746-2226
Rock Creek Township: Diana Highbanks, 747-2314
Rosalia Township: Thomas Hinton, 620-476-2447
Spring Township: Don Bear, 775-5121
Sycamore Township: Kip Hiebert, 620-735-4299
Towanda Township: Mac Corbin, 775-2889
Union Township: Max Craig, 620-965-2548
Walnut Township: Edwin Gray II, 747-2677

U S Army Corps of Engineers

Tulsa District
1645 South 101st Avenue
Tulsa, Oklahoma 74128
918-669-7400
www.usace.army.mil



Any person wishing to place fill materials in the waters of the nation (rivers, creeks, etc.) must receive a Section 404 permit from the U.S. Army Corps of Engineers. The Corps of Engineers has regulatory responsibility of administering Section 404 of the 1972 Clean Water Act, which covers all waters of the nation. This includes dredging, filling or channeling water courses or wetlands.



USDA Farm Service Agency

2503 Enterprise, Suite A

El Dorado KS 67042

316-321-5803

www.fsa.usda.gov



Farm Service Agency

Aerial photos are available through this office. The USDA Farm Service Agency administers farm commodities, farm credit and conservation programs for farmers through a network of state and county offices. FSA programs are primarily directed at agricultural producers or, in the case of loans, at those with farming experience.

USDA Natural Resources Conservation Service (NRCS)

2503 Enterprise, Suite B

El Dorado KS 67042

316-321-5814

www.ks.nrcs.usda.gov



Information about local soils and other natural resource and conservation issues are available through the NRCS. NRCS is also a resource for topographic maps, flood plain maps and aerial photos. NRCS provides survey and design work for terraces, waterways, livestock waste systems and ponds. The NRCS can also develop range management plans, conservation plans and nutrient management plans.

United States Post Office

For Zip Codes, Mailing Rates and Post Office Hours and Locations 24 hours a day, 7 days a week, call 1-800-275-8777.

www.usps.com

<u>City</u>	<u>Zip</u>	<u>Phone Number</u>
Andover	67002	316-733-0122
Atlanta	67008	620-394-2306
Augusta	67010	316-775-6141
Beaumont	67012	620-583-5451
Benton	67017	316-778-1071
Burns	66840	620-726-5217
Cassoday	66842	620-735-4471
Douglass	67039	316-746-2691
Elbing	67041	316-799-2681

United States Post Offices (continued)

El Dorado	67042	316-321-5950
Latham	67072	620-965-2495
Leon	67074	316-745-3547
Potwin	67123	620-752-3268
Rosalia	67132	620-476-2282
Rose Hill	67133	316-776-2515
Towanda	67144	316-536-2613
Whitewater	67154	316-799-2301

United States Geological Survey

www.usgs.gov

Provides water, earth, biological science and civilian mapping information to individuals to assist in natural resource and conservation planning.

U S Fish and Wildlife Service

315 Houston, Suite E
Manhattan KS 66502
785-539-3474
www.fws.gov



Enforces federal wildlife statutes and regulations. They work with various federal, state, local and private individuals on a variety of educational and wildlife habitat improvement projects.

Walnut Basin Advisory Committee

Kansas Water Office
109 SW 9th Street
Topeka KS 66612
785-296-3185
1-888-526-9283
www.kwo.org

Butler County lies within the Walnut Basin. The Walnut Basin Advisory Committee identifies water related problems, issues and concerns within the Basin to help identify goals and objectives that can be used to direct subsequent planning efforts. They advise and assist the Kansas Water Office in the formulations of revisions to the Kansas Water Plan. They serve as a liaison between residents of the basin and the Kansas Water Office by encouraging an awareness of the importance of the basin's water resources. The Advisory Committee provides input on water plan implementation priorities and encourages local action necessary to implement the basin plan.

Water Well Drilling – Obtain a permit from Butler County Planning, Zoning and Environmental Services. In the yellow pages, look under *Water Well Drilling/Services*.

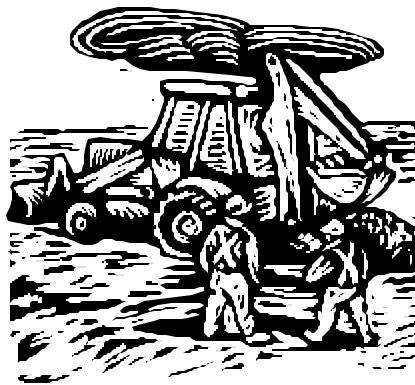
Westar Energy/Kansas Gas Service (Formally KGE) - 1-800-794-6101

Yard Waste – See Composting or Landfill.

1-800-DIG SAFE

1-800-344-7233

If you are planning to do any construction work, earthwork or other work which might affect underground pipelines, waterlines, phone lines, etc., call this number. They will mark the area with flags free of charge.



CHAPTER 7

MAPS

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• Townships	80
• Watershed Drainage Basins	81

District 1
Andy Doll
67 Ginkgo
Dover KS 67002
5-733-9981

District 2
Bill Shriver
4 Taylor Avenue
Augusta KS 67010
316-775-9350

District 3
Will Carpenter
6965 SW 18th Street
El Dorado KS 67042
316-541-2932

District 4
Mike Wheeler
1951 Chelsea Drive
El Dorado KS 67042
316-377-1000

District 5
Phil Anderson
21311 SW Hunter Road
Douglass KS 67039
316-747-2723

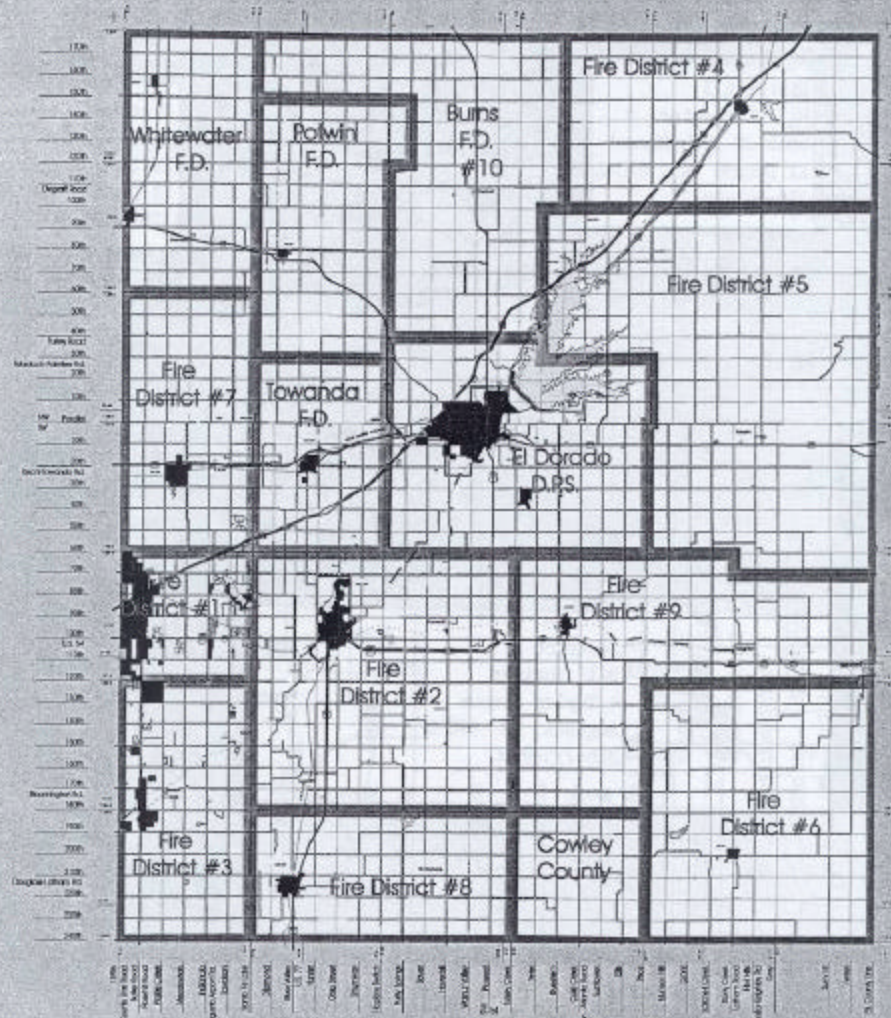
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20
Miles

BUTLER COUNTY



K a n s a s



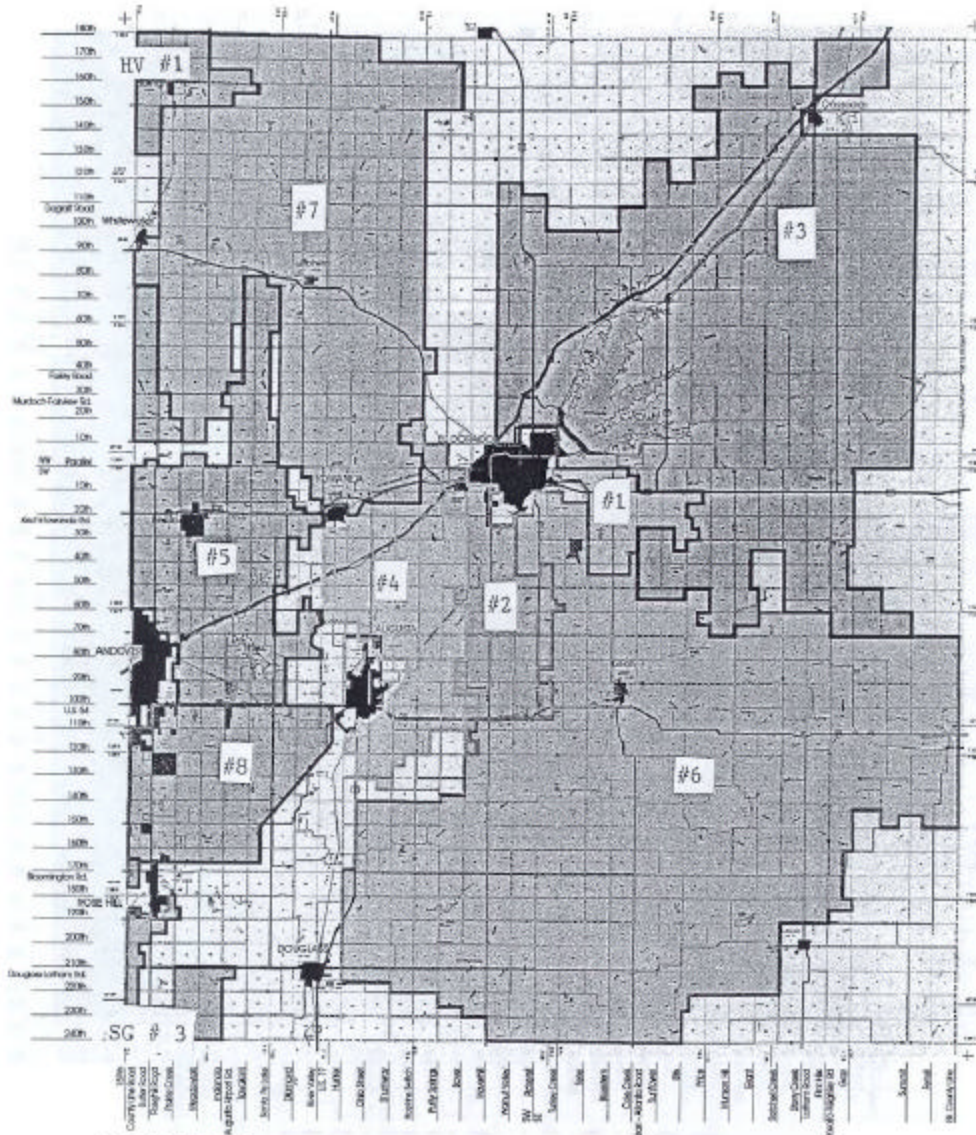
FIRE DISTRICTS

Note: Fire District #1 is now called Andover Fire & Rescue

BUTLER COUNTY



K a n s a s



LEGEND

WATER DISTRICT 1
320-1201
 WATER DISTRICT 2
320-1201
 WATER DISTRICT 3
(620)476-2439
 WATER DISTRICT 4
775-2613

WATER DISTRICT 5
778-1631
 WATER DISTRICT 6
320-1301
 WATER DISTRICT 7
752-3284

WATER DISTRICT 8
789-8973
 HARVEY COUNTY-1
 SEDGWICK COUNTY-3

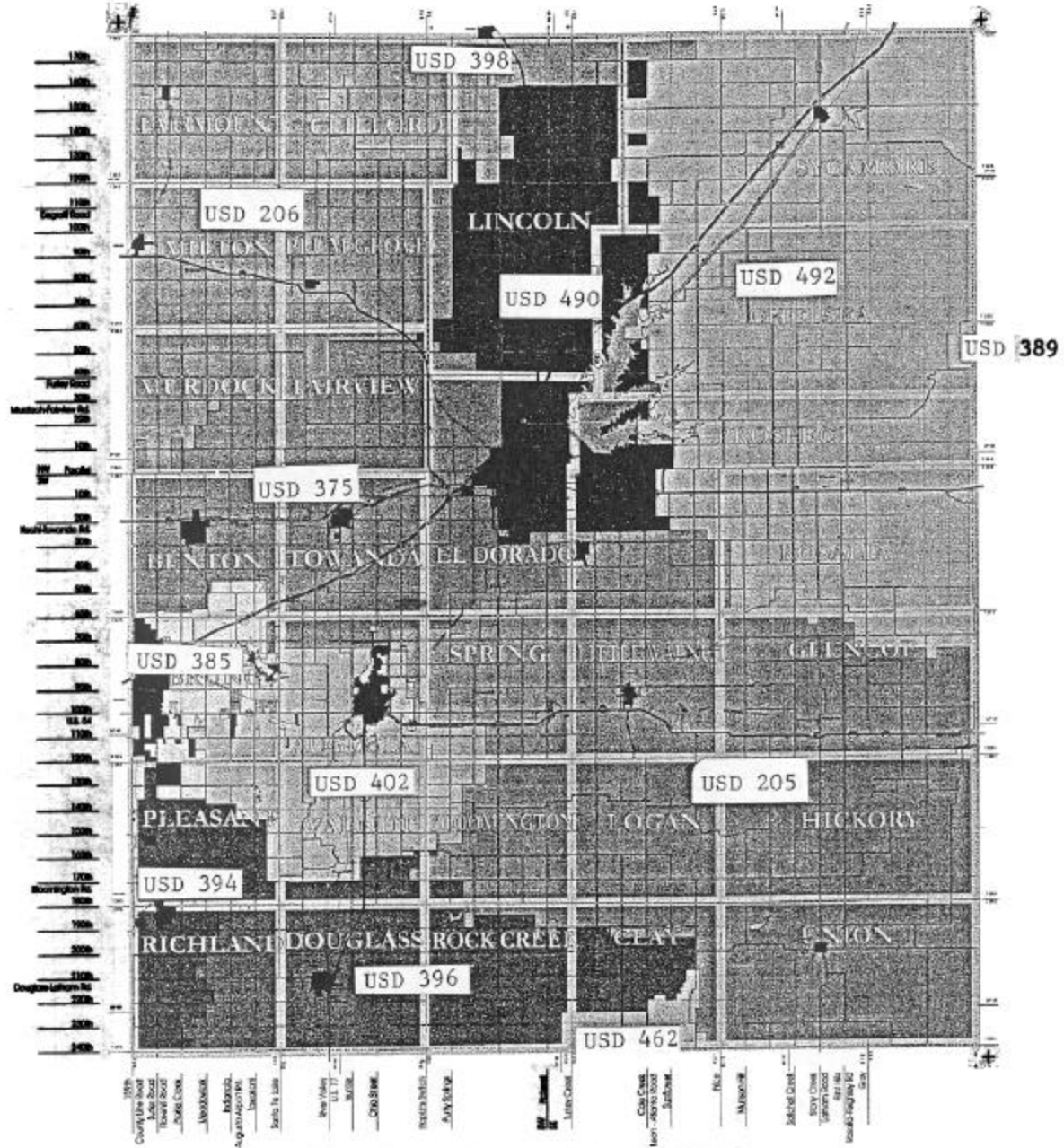
BUTLER COUNTY



Planning & Development Department



K a n s a s



SCHOOL DISTRICTS

LEGEND

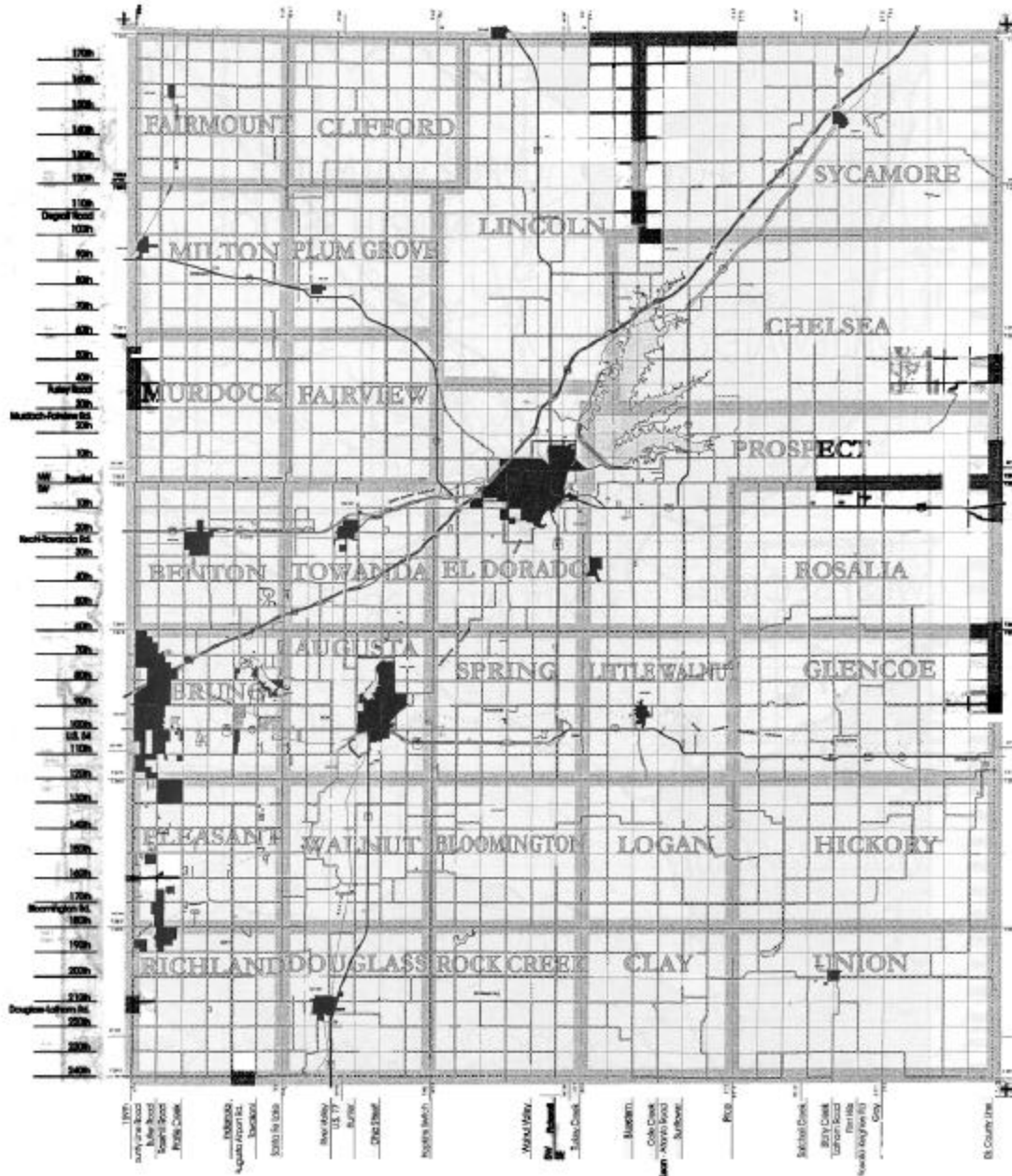
	USD 205		USD 385		USD 396		USD 462
	USD 206		USD 389		USD 398		USD 490
	USD 375		USD 394		USD 402		USD 492

BUTLER COUNTY

K a n s a s



Planning & Development Department

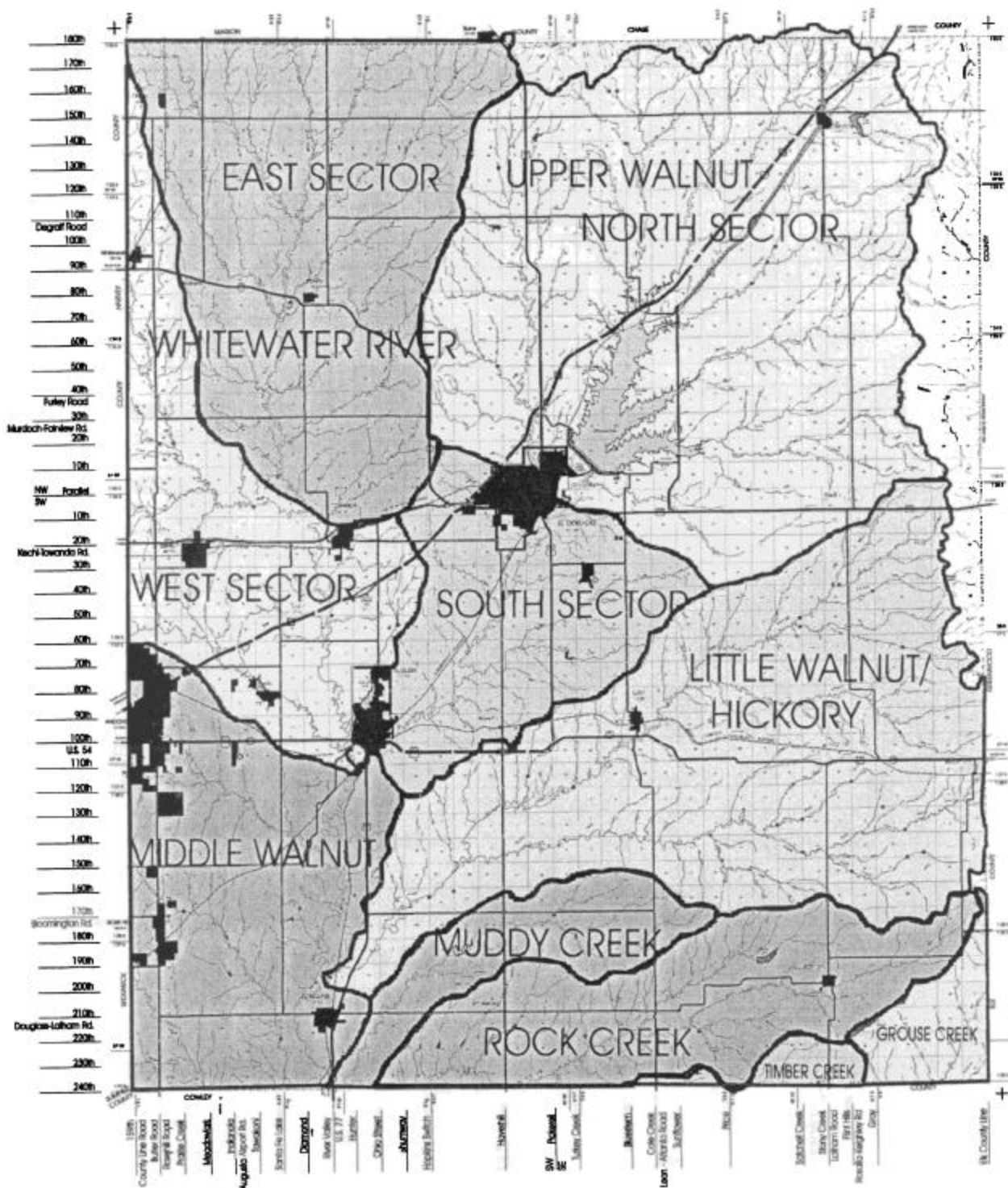


Township Boundary Map

Planning & Development Department



K a n s a s



WATERSHED DRAINAGE BASINS